Appendix A
2012 STREAM MAINTENANCE PROGRAM MANUAL

2012-2022 Stream Maintenance Program Manual

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SCVWD
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2012 – 2022 STREAM MAINTENANCE PROGRAM MANUAL

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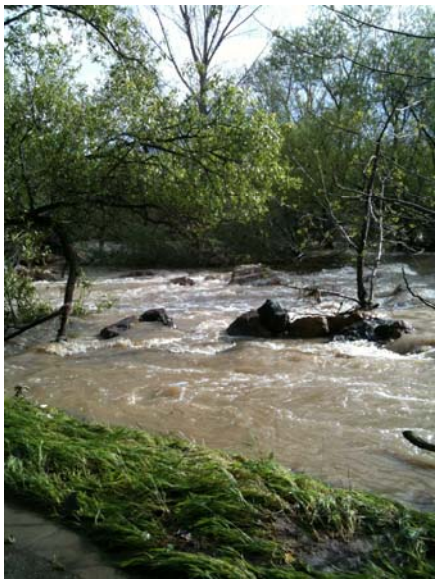
1. INTRODUCTION

The 2012 – 2022 Stream Maintenance Program (SMP) Program Manual describes the authorized work activities, calendar timing for the activities, Best Management Practices to be implemented while performing the work, work specific exclusions, and a description for calculating any necessary mitigation.

1.1. Purpose

The Stream Maintenance Program (SMP/Program) establishes an ongoing maintenance program for the Santa Clara Valley Water District's (District/SCVWD) streams, canals, and stream gauges. The SMP was first approved in 2001. Though the SMP is written as a long-term program, it also allows for periodic updates as necessary to meet new conditions or maintenance needs of the District. This document describes the 2012-2022 Santa Clara Valley Water District's Stream Maintenance Program. This is an update from the 2001 Program with more detailed descriptions for work locations and assessment, updated mapping tools and species listings. The SMP and Final Environmental Impact Report adopted in 2001 (2001 FEIR), used a 20-year planning time frame to evaluate cumulative impacts. This Program document covers the second 10-year period and wholly replaces documents that guided the SMP from its inception in 2001 until 2012. The 2012 FEIR will be the stand-alone environmental document for the updated program.



Program Goals

<u>The SMP work activities are developed to meet two program goals.</u>

1. Maintain the design flow conveyance capacity (or the appropriate capacity when no design capacity exists) of District facilities, and
2. Maintain the structural and functional integrity of District facilities.

Program Objectives

The following objectives will be used to meet these goals:

1. Remove sediment to maintain the hydraulic, safety, and habitat functions of the creek systems;
2. Manage vegetation to maintain the hydraulic, safety, and habitat functions of the creek systems, and to allow for levee inspections and maintenance access;
3. Stabilize beds and banks of creeks and canals to protect existing infrastructure, maintain public safety, reduce sediment loading, protect water quality, and protect habitat values; and
4. Avoid, minimize, or mitigate impacts on the environment by incorporating stream stewardship ~~principles~~ measures into maintenance activities.

1.2. SMP Principles

These principles have been developed to ensure that natural resources are protected to the furthest extent possible during routine stream maintenance projects. BMPs have been developed to implement these principles. The BMPs are included as Table 2-12, DSEIR Project Description. The principles in the SMP have been developed to guide decision-making for stream maintenance activities and projects. Principles are based on the SMP objectives and are a means to the District's Ends Policies (December 15, 2009).

Principle 1: The District will process all routine stream maintenance activities according to the process and protocols established in the Program.

Principle 2: Decisions regarding the necessity of routine sediment removal and vegetation management activities (to restore channel flow capacities) will be made following the thresholds established in the Maintenance Guidelines.

Principle 3: The District will implement measures to avoid and minimize impacts to native species and habitat.

Principle 4: All maintenance activities will be performed in a manner that has the least impact to the natural flora, fauna and aquatic resources while meeting the project objectives.

Ends Policies – Board of Directors Established

E-1 Mission and General Principles

The mission of the District is a healthy, safe, and enhanced quality of living in Santa Clara County through watershed stewardship and comprehensive management of water resources in a practical, cost-effective, and environmentally-sensitive manner for current and future generations.

Maintenance of the creeks under the SMP is an integral part of the mission, which combines work needed for comprehensive and efficient management within the context of environmental requirements.

E-2 Water Supply: There is a reliable, clean water supply for current and future generations.

Goal 2.1	Current and future water supply for municipalities, industries, agriculture and the environment is reliable
Objective 2.1.1	Aggressively protect groundwater basins from the threat of contamination and maintain the groundwater basins for reliability.
Objective 2.1.2	Protect, maintain and develop local water.

E-3 Natural Flood Protection: There is a healthy and safe environment for residents, businesses and visitors, as well as for future generations.

Goal 3.1	Natural flood protection for residents, businesses and visitors.
Objective 3.1.1	Balance environmental quality and protection from flooding in a cost effective manner.
Objective 3.1.2	Preserve flood conveyance capacity.

The SMP is intended to authorize routine work needed to preserve flood conveyance capacity.

E-4 Water Resources Stewardship: There is water resources stewardship to protect and enhance watersheds and natural resources and to improve the quality of life in Santa Clara County.

Goal 4.1	Healthy creek and bay ecosystems
Objective 4.1.1	Balance water supply, flood protection and environmental stewardship functions.
Objective 4.1.2	Improve watersheds, streams, and natural resources.
Objective 4.1.3	Promote awareness of creek and bay ecosystem functions.
Goal 4.2	Clean, safe water in creeks and bay.
Objective 4.2.1	Preserve or improve surface and ground water quality for beneficial uses.
Objective 4.2.2	Promote awareness of water quality and stream stewardship.
Goal 4.3	Improved quality of life in Santa Clara County through trails, open space and water resources management.
Objective 4.3.1	Support additional trails, parks and open space along creeks and in the watersheds when reasonable and appropriate.
Objective 4.3.2	Reduce greenhouse gas emissions when reasonable and appropriate.

The SMP integrates the principal of resource management into the work. Program elements are designed to avoid, minimize or mitigate potential impacts in balance with the need to conduct work in streams to carry out the District's mission.

1.3. General Applicability

The SMP applies to all of the District's routine stream and canal maintenance activities that can be grouped into five categories: vegetation management, sediment removal, bank stabilization, management of animal conflicts, and minor maintenance activities. Routine maintenance is defined as the work activities described in this plan that occur in the course of standard maintenance work or procedures and are performed regularly, and often repeated. These activities can occur within the SMP program area ~~(See Figure ES-1)~~[1] below the 1000-foot elevation contour, and along approximately 800 miles of creek, 41 miles of 11 canals, and related facilities. Stream gauge maintenance activities are covered in the SMP through the appropriate work activity projections.

Future maintenance work projections for the program period 2012-2022 were developed by an interdisciplinary team familiar with and responsible for conveyance requirements of the creeks. Work projections were made to describe the estimated location and work area percentage for Program work activities. These projections were used to perform the environmental impacts analysis in the 2012 SMP FEIR. Maintenance activities are permitted throughout the program area as long as they do not result in significant environmental effects substantially different than those evaluated for the Program as a whole. Work that is conducted in areas not originally projected in 2002, will require mitigation as described in the Mitigation Approach Memorandum, Appendix C, 2012 SMP FSEIR~~, and included in the Mitigation chapter of this Manual~~. Work projected in the 2002 SMP has been mitigated for in perpetuity.

1.4. General Exclusion

The SMP does not include the following activities (2012 SMP FEIR):

1. Emergency repair work;
2. Work that would increase the flow conveyance or water supply capacity of a facility;
3. Maintenance work in stream reaches that are above the 1,000-foot elevation contour (areas typically above the reservoirs);
4. Maintenance work of dams, reservoirs and other water supply facilities, such as pipelines outside of stream corridors, groundwater percolation ponds, and in-stream summer dams;
5. Installation of new or major modification of fish ladders;
6. Hazard tree removals;
7. Work conducted on private property by owners or other agencies;
8. Work performed by other agencies;
9. Large construction projects or capital improvement projects;
10. Area-wide, intensive maintenance, or rehabilitation of large [>0.05 acre] mitigation projects installed as part of Capital Improvement Projects and which have persisted beyond the Establishment Period; ~~and~~
11. Continued implementation of the 2002 SMP mitigation, monitoring and reporting program, and

12~~1~~. Work activities specifically excluded in the Program.

1.5. Capital Improvement Projects

Large construction projects and Capital Improvement Projects (CIP) are not considered routine stream maintenance and are not addressed through the SMP. Future CIPs will analyze and account for long-term maintenance impacts under their

own environmental review documents. The analysis of long term maintenance for a CIP is expected to follow a systematic process, evaluating the design for the least amount of maintenance and then determining whether the needed maintenance is already included in the SMP.

Step 1: Compare new project maintenance needs to Permanent Mitigation.

Analyze the required future maintenance of the new project against the Permanent Mitigation Areas (PMA)~~2002 Projections~~ (defined as the 2002 projections plus any changes made since 2002: adding CIP reaches, swapping out work never conducted in 2002-2012 to provide unaccounted for mitigation that is now available to apply toward other work activities, and new work areas that have provided mitigation in perpetuity).

Any environmental effects from ~~of~~ required new future maintenance ~~new~~ of CIPs or other new projects will be compared to the Permanent Mitigation Areas~~2002 SMP projections~~ for that reach of creek. Mitigation for CIPs will only be required if there are ~~impacts~~ future maintenance needs from the capital project that are~~were~~ not ~~projected~~ in the ~~2002 SMP~~ Permanent Mitigation Areas. It is presumed that some of the maintenance needs will be projected in the Permanent Mitigation Areas, but not necessarily to the scale that will be needed once the CIPs are complete. ~~Only work projected in 2002 can be used as a comparison to CIPs. All maintenance needs for the CIP not completely projected in the 2002 SMP, must be assessed and mitigated through the CIP.~~

If all of the future maintenance needs are not in the Permanent Mitigation Areas, then proceed to Step 2.

Step 2: Include new project maintenance needs not in Permanent Mitigation Areas into the new project environmental document.

To the extent that future maintenance work requirements are not covered by the Permanent Mitigation Areas of the 2002 SMP and incorporated projects, the long-term incremental maintenance needs, including the scale and frequency of work needed, must be analyzed and accounted for under the CIP/other new project. The mitigation required for those impacts must be included in the CIP environmental document and will need to provide up front permanent mitigation for repeated maintenance impacts in perpetuity. Only then will those incremental future maintenance activities be added to the SMP Permanent Mitigation Area projections.

~~After the environmental review is completed for a new CIP project, the routine maintenance of the constructed project will be integrated into the SMP. Any incremental maintenance work required by the CIP will be added to the SMP projections and any incremental mitigation will be added to the programmatic mitigation package.~~

1.6. Work Projections

1. Management

The routine maintenance activities conducted by the District and described in this Manual exhibit consistent attributes and patterns. However, projections of future stream maintenance activities for the SMP and Program FEIR cannot represent the exact extent of work that will occur. Actual stream maintenance activities can vary from year-to-year.

Therefore, work projections were made to describe the estimated location and work area percentage for Program activities for the 2012-2022 period. These projections were used to perform the environmental impacts analysis in the 2012 SMP FEIR; and thereby determine potential impacts, and the necessary associated Best Management Practices (BMPs) and mitigation measures. Maintenance activities are permitted throughout the program area as long as they do not result in significant environmental effects substantially different than those evaluated for the Program as a whole.

Work is considered included in the SMP if the work is consistent with the District's Maintenance Guidelines or the work is needed to maintain the flow conveyance capacity of a facility but does not increase the design flow conveyance capacity. Work areas must be managed for the entire Program area to ensure that the maximum work covered by the Program, FEIR and regulatory permits, is not exceeded. Work activity impacts in areas not projected in 2002 are calculated on an annual basis, in conjunction with any resulting required mitigation. Work areas projected in the 2002 SMP have been mitigated for in perpetuity, will continue to have work performed in these areas, and will not need to calculate impacts annually.

In addition, the Program supports site specific assessments to determine the most effective method to achieve the maintenance goal. If it is determined that a lower impact work activity method is viable for the site, the new work activity will be proposed through either the Notice of Proposed Work (NPW) process or in consultation with the regulatory agencies involved. This will support an assessment for work activity modification that could result in a more benign method being used than was originally projected.

Permanent Mitigation Areas

Maintenance areas that have dedicated mitigation provided in perpetuity will be referred to as Permanent Mitigation Areas (PMAs). The PMAs will be a set of work areas that are mitigated for in perpetuity. These areas will grow as new work areas are mitigated through the land acquisition and enhancement process. When mitigation lands are acquired, the District will identify which of the "new work areas" now identified under the 2012 SMP would be mitigated for (in perpetuity) by the acquired lands. Similar to providing mitigation for new work areas, this same process of acquiring lands to be applied as mitigation can be used to provide mitigation for other work areas that were not projected. Such "not projected but worked" areas from the 2002-2012 period can be added to the pool of Permanent Mitigation Areas (PMAs) that are mitigated for in perpetuity, if appropriate mitigation lands are acquired and they provide a good match for such lands.

Additionally, some areas may be removed from the PMA if work has never been performed in that area, and no need for future work in that area is anticipated. Under such a scenario, the projected work area (and its impacts) that are no longer necessary would be removed from the PMA program. The compensatory mitigation that had already been provided would remain, but would no longer be allocated towards a particular work activity and location. Work areas and activities that are not previously covered, as being included in the PMA, can be added to the PMA by applying this unallocated mitigation. In this way, unallocated mitigation-in-perpetuity from the 2002 Program may now be applied to alternative work areas.

Any inclusion of such work areas into the PMA pool of work areas mitigated for in perpetuity would be reviewed by participating regulatory agencies.

2. Ownership

The District performs work where it owns property in fee title or has an easement. The Board of Directors may also approve work to be performed on private property if it is determined that the erosion, scour or other maintenance needs are negatively affecting the flow conveyance and bank stability of the creek system. Due to the skill and knowledge necessary to maintain the function of the creek system, it may become necessary for the District to work on private property in order to provide general public safety.

The District has also projected work for areas where there are not current fee or easement property rights, but where it is determined that there may be maintenance needs over the life of this Program. The District may acquire new property rights through purchase in fee title or easement to: provide creek access, prevent encroachment of development into flood plains, and meet the goals and objectives of this Program.

3. Locations

Work is identified by work activity and location. Location identification begins at the center of the creek and extends outward. Cross sectional areas include: in-stream and bank/bench, which may include a maintenance road; and where there is a levee, levee inboard – top of levee – levee outboard.

1.7. Description per Work Activity

1. Vegetation Management

   Vegetation work impacts in new areas are assessed annually, calculating necessary mitigation per the requirements in the Mitigation Approach Memorandum, Appendix C FSEIR ~~chapter of this manual~~. Tree and shrub removals 6-12 inches diameter at breast height (dbh) may occur on a project specific basis per the criterion and mitigation described in Attachment C this manual. Work projected in the 2002 SMP has been mitigated for in perpetuity, will continue to have work performed in these areas, and will not need to calculate impacts annually.

2. Sediment Removal

   Sediment removal impacts in new areas are assessed annually, calculating necessary mitigation per the requirements in the Mitigation Approach Memorandum, Appendix C FSEIR ~~chapter of this manual~~. Work projected in the 2002 SMP has been mitigated for in perpetuity, will continue to have work performed in these areas, and will not need to calculate impacts annually. Sediment removal can be performed in any stream within the SMP program area.

3. Bank Stabilization

   Bank stabilization work can be performed in any creek under District jurisdiction (fee title, easement, or directed by the Board of Directors) unless specifically excluded by this Program. Bank stabilization work is assessed per project site as it cannot be pre-determined where a site will need repair. The District has made a commitment that no more than half of the bank repairs will consist of impervious hardscape bank stabilization work (all watersheds combined) each year.

4. Management of Animal Conflicts

   The District manages animal damage and conflicts in District creeks and canals. Animals may damage District facilities by burrowing into levees, banks and along canals, forage on mitigation sites, and interfere with work activities. To avoid compromising District facilities and to reduce conflicts with species living in or protecting sites where work is needed, the management of animal conflicts may be undertaken.

5. Minor Maintenance

   Minor Maintenance activities (fence repair, graffiti removal, access road maintenance, etc.) are not a projected work activities and may occur anywhere within the SMP program area.

6. Canal Maintenance

   The primary function of District canals are to serve as water supply transport facilities, though they also provide incidental flood protection by capturing surface runoff. Canal maintenance activities include all the work activities discussed above.

1.8. Work Window

A. Work Window Extensions

Requests for work window extensions must be submitted to the regulatory agencies by October 1st, listing the creek names and reaches where a work extension will occur. Work extensions vary per work activity. The agencies will

provide a single response within one week. Significant rainfall applies after October 15.

B. Vegetation Management

Woody Vegetation Management activities may occur based on the following:

1. In-stream (wetted area) hand pruning and hand removal may occur year round, except:
    a) where ~~large~~ mechanized equipment would need to access the site by crossing a creek or otherwise affect water quality, or
    b) in steelhead creeks, where work is only permitted until December 31 or until local rainfall of 0.5 inches or greater falls within the subject watershed within a 24-hour period, whichever transpires first.

2. Vegetation management outside the bankfull channel (see section 2.1.6 for definition) may be performed year round.
    a) Year round work opportunities do not apply to areas where ~~large~~ mechanized equipment would need to access the site by crossing a creek or otherwise affect water quality.
3. Due to separate project permits and/or CEQA/NEPA requirements, individual sites may have additional limitations on work types and work windows. Where these modified conditions occur they will be incorporated into the SMP.

Herbicide Vegetation Management activities may occur based on the following and per the MSDS and label:

1. In-stream herbicide use is a projected work activity and may occur between June 15 - October 15.
2. In-stream work may continue until December 31 or until local rainfall greater than 0.5 inches falls within the subject watershed within a 24-hour period, whichever occurs first.
3. ~~Upland~~ Non-instream (bank/bench) herbicide work may occur year round, weather permitting.

C. Sediment Removal

Sediment removal may occur during the work window of June 15 – October 15. Water quality monitoring shall be performed per the Water Quality Monitoring Plan and all excavated sediment shall be tested per the Sediment Characterization Plan. ~~Water~~

~~quality monitoring shall be performed per the Sediment Characterization Plan at each sediment removal site.~~

1. Extended Work Window.
    a. Creeks supporting anadromous fish:
    An extended work window may occur from October 15 through October 31, or until local rainfall of 0.5 inches or greater falls within the subject watershed within a 24-hour period, whichever occurs first.
    b. Creeks not supporting anadromous fish:
    An extended work window may occur from October 15 through November 30th, or until local rainfall of 0.5 inches or greater falls within the subject watershed within a 24-hour period, whichever occurs first.

2. Extended Work Window in Lower Quality Areas~~Requirements~~:
    a. Work may occur~~continue~~ until December 31. ~~or until local rainfall of 0.5 inches or greater falls within the subject watershed within a 24-hour period, whichever occurs first~~
    b. Work areas will be included in the annual NPW.
    c. ~~Additional~~Work will only~~may~~ occur ~~after a significant rainfall event of 0.5 inches within a 24 hour period, only~~within Berryessa Creek (0-88+80; 232+70-236+00; 284+30-288+00), Lower Silver Creek (Reach 3 between Stations 37+40 and 381+19~~)~~), Thompson Creek (0+00-10+00), Canoas Creek (0+00-390+00), Ross Creek (0+00-86+30), Calabazas Creek (35+00-105+00), and San Tomas Aquino Creek (80+00-100+00), if:
        1) a preconstruction biological survey is performed and clearance provided,
        2) site conditions are dry and access for all construction equipment and vehicles will not impact roadways,
        3) water diversions will not be allowed,
        4) all work will stop if any rainfall event is forecast three (3) days into the future, and ~~an~~
        5) ~~email notification of work will be provided to the regulatory agencies two (2) days in advance of scheduled work~~

        ~~S~~sites must be maintained in a winterized state. (See section 4. Bank Stabilization, I.~~glossary~~ for a definition of winterization.)
    d. Work may occur after a significant rainfall event but no later than December 31.

D. Bank Stabilization

Bank stabilization work is allowed during the work window of June 15 – October 15. If a work extension is granted~~project is more than 50% complete on October 15~~, it may continue until the approved date stated below~~ completion, December 31~~, or until the first 72-hour~~5-day~~ forecast that includes significant rainfall. Significant rainfall is local rainfall 0.5 inches or greater that falls within a 24-hour period in the subject watershed.

1. In Creeks Supporting Anadromous Fish
   An extended work window may occur until October 31st for bank stabilization projects that will be 50% complete by October 15th.

2. In Creeks Not Supporting Anadromous Fish
   a. An extended work window may occur until November 30th for projects that will be 50% complete by October 15th or until significant rainfall.
   b. An extended work window may occur until November 30th for new bank stabilization projects that will be completed in five (5) days or less, or until significant rainfall.

E. Management of Animal Conflicts

Management of animal conflicts may occur year round. The method of control used will be based on the seasonal efficacy of the animal's life cycles and in compliance with the protection of special-status species.

F. Minor Maintenance

Minor Maintenance activities may be performed year round or within the Work Window for specified Work Activities. Minor sediment or vegetation work must comply with the Work Windows specific to those work activities, even when they are Minor Maintenance activities.

G. Canal Maintenance

Canal Maintenance activities may be performed as defined by the work activity and per the description of annual work maximums in the Canal Maintenance section of this Manual.

1.8.1 Work Window Tables

Instream Work Window In Creeks Supporting Anadromous Fish

Work Activity	June 15 – Oct 15	Oct 15 – Oct 31 No work once significant rainfall (0.5" within 24-hr within watershed)	Oct 15 – Dec 31 No work once significant rainfall (0.5" within 24-hr within watershed)
Instream hand pruning	X		X
Instream hand removal	X		X
Herbicide	X[1,2]		X[1,2]
Sediment Removal	X	X	
Bank Stabilization	X	X, if at least 50% complete on October 15	

[1] Surfactant use on the 14 steelhead streams is permitted when the stream is dry in the immediate work location and no rain is forecast for the next 24 hours.

[2] Aquatic herbicide can only be used in California red-legged frog and California tiger salamander SMP mapped areas when the creek is dry and no rain is forecast for the next 48 hours.

After October 15th, seventy-two-hour look-ahead weather forecasts from the National Weather Service (or local vendor such as the Western Weather Group) are consulted to prepare for possible winterization measures. If a significant rainfall is forecast within the coming 72-hr forecast window, then maintenance work that may result in sediment runoff to the stream shall be stopped, to allow adequate time to complete erosion control measures. Winterization materials will be available and on-site when rain falls.

Instream Work Window In Creeks Not Supporting Anadromous Fish

Work Activity	June 15 – Oct 15	Oct 15 – Nov 30 No work once significant rainfall (0.5" within 24-hr within watershed)	Oct 15 – Dec 31 No work once significant rainfall (0.5" within 24-hr within watershed)	June 15 – Dec 31 Work even after significant rainfall (0.5" within 24-hr within watershed)	Year Round, except where mechanized equipment crosses a creek or otherwise affecting water quality
Instream hand pruning	X				X
Instream hand removal	X				X
Herbicide	X		X		
Sediment Removal	X	X		X, specific reaches of Berryessa, Lower Silver, Thompson, Canoas, Ross, Calabazas, San Tomas Aquino	
Bank Stabilization	X	X a) if at least 50% complete on October 15 b) new projects that will be completed in five (5) days or less			

Significant rainfall applies after October 15. After October 15th, seventy-two-hour look-ahead weather forecasts from the National Weather Service (or local vendor such as the Western Weather Group) are consulted to prepare for possible winterization measures. If a significant rainfall is forecast within the coming 72-hr

forecast window, then maintenance work that may result in sediment runoff to the stream shall be stopped, to allow adequate time to complete erosion control measures. Winterization materials will be available and on-site when rain falls.

Non-Instream Work Window

Work Activity	Year Round, except where mechanized equipment crosses a creek or otherwise affecting water quality	Time Specific
Vegetation Management	X	
Herbicide	X per MSDS label	
Large Woody Debris	X See Management of LWD guidelines	
Mowing		Feb 1 – Nov 30
Discing		Feb 1 – Oct 15
Flaming	X	
Grazing	X	
Management of Animal Conflicts	X Per special status species and pesticide requirements	
Minor Maintenance	X Instream work follows activity specific work windows	

1.9. Best Management Practices (BMPs)

Best Management Practices (BMPs) have been incorporated into the project activities to avoid and minimize environmental impacts. General BMPs apply to all work. Other BMPs are applicable to specific work activities. See Table 2-12, DSEIR Project Description.

1.10. Process Overview

1. District Work Process

The District's stream maintenance planning, implementation, and reporting process occurs in three phases: 1) program development and documentation; 2) implementation of annual routine stream maintenance work; and 3) annual reporting. Maintenance work can be proposed either as part of the Annual Work Plan through the “Notice of Proposed Work” (NPW) or as other identified work throughout the year via individual work orders. All stream maintenance activities will follow the Resource Protection Protocols as described below.

The District uses work orders to describe and implement stream maintenance projects. Work orders provide a description of the project, schedule of implementation, estimated costs, permit requirements and other special conditions. Work orders will continue to be the primary vehicle for the implementation of maintenance projects.

As maintenance work is proposed, it will be evaluated to determine if the work is addressed under the SMP. If not, the work will follow the appropriate project development process, which may include individual CEQA review and individual regulatory permits or clearances. An example of this type of work would be the removal of a drop structure in a stream.

The proposed work is also evaluated under the requirements of the individual creek Maintenance Guidelines to ensure that the maintenance activity meets pre-established engineering requirements. For example, if a sediment removal project is proposed, the Maintenance Guidelines provide the information on the allowable depth of sediment for a reach that will still provide the designed flow conveyance. Maintenance Guidelines are updated as new CIPs are completed, as better maintenance methods are developed, or as refinements are made to the level of maintenance required in a reach of creek.

2. SMP Compliance Verification ~~Flow Chart~~

Work is proposed in the Annual Work Plan through the Notice of Proposed Work or as individual work orders identified throughout the year. Work will be evaluated for compliance with the Program. Work that does not meet the requirements and parameters of the SMP cannot be covered. In these cases, other CEQA and regulatory coverage will need to be obtained.

Work that may be covered by the Program will be reviewed to verify that it is covered under the long-term regulatory clearances provided in conjunction with the Stream Maintenance Program. Appropriate resource protection measures and BMPs will be identified and added to the work order package. Pre-work conferences will be held with staff necessary to perform the work, including the appropriate staff from Watershed Program Support Units, Field Operations, Vegetation Management and Stream Stewardship to discuss site-specific requirements, environmental constraints, and BMPs.

Work order requests will follow the District's QEMS document WQ75101 – Field Operations Work Order Process. A clearinghouse of experienced and SMP competent staff will assess, develop, and authorize work, compliant with the 2012-2022 SMP, BMPs, required mitigation, and other natural resource protection protocols.

1.11. Process for Program Improvement

An annual "Lessons Learned" meeting between the District and regulatory agency staff will occur, usually in February, to evaluate the effectiveness of both resource protection and maintenance methods used in the preceding maintenance year. The information and assessments will be used to update BMPs, and Stream Maintenance Program processes to create a greater understanding of how to accomplish environmentally-sensitive, fiscally sound maintenance work.

1.12. Regulatory Framework

The SMP applies to all work necessary for the: maintenance of flow conveyance capacity of the canals, creeks and rivers; protection of the banks adjacent to those facilities; proper operation of stream gauges; and to promote the ecological stewardship of the riparian system. It may be necessary to obtain additional permits or authorizations for work within the SMP area that is not covered by this Program.

Regulatory agencies with jurisdictional authority in the SMP area and from which permits are obtained include the: Bay Conservation and Development Commission (BCDC), California Department of Fish and Game (CDFG), U.S. Army Corps of Engineers (USACE), National Oceanic Atmospheric Administration (NOAA) National Marine Fisheries Service (NMFS), U.S. Fish and Wildlife Service (FWS) and the Regional Water Quality Control Boards (RWQCBs) – San Francisco Bay and Central Coast). The following is a description of each regulatory agency and their jurisdiction within the SMP.

1. Bay Conservation and Development Commission (BCDC)

BCDC has regulatory responsibility over development in San Francisco Bay and along the Bay's nine-county shoreline. BCDC works with its federal, state and local partners in the Long Term Management Strategy (LTMS) for the Placement of Dredged Material in the San Francisco Bay Region to manage dredging and disposal activities in the Bay Area. Formed in 1990, the LTMS Program is a collaborative partnership involving the regulatory agencies, resource agencies and stakeholders working together to maximize beneficial reuse of dredged material and minimize disposal in the Bay.

It is necessary to obtain a BCDC permit prior to undertaking most work in the Bay or within 100 feet of the shoreline, including filling, dredging, shoreline development and other work.

2. California Department of Fish and Game

a) Lake and Streambed Alteration program

The Department of Fish and Game (DFG) is responsible for conserving, protecting, and managing California's fish, wildlife, and native plant resources. To meet this responsibility, the Fish and Game Code (Section 1602) requires an entity to notify DFG of any proposed activity that may substantially modify a river, stream, or lake.

Notification is required by any person, business, state or local government agency, or public utility that proposes an activity that will:

1) substantially divert or obstruct the natural flow of any river, stream or lake;
2) substantially change or use any material from the bed, channel, or bank of, any river, stream, or lake; or

3) deposit or dispose of debris, waste, or other material containing crumbled, flaked, or ground pavement where it may pass into any river, stream, or lake.

If DFG determines that the activity may substantially adversely affect fish and wildlife resources, a Lake or Streambed Alteration Agreement will be prepared. The Agreement includes reasonable conditions necessary to protect those resources and must comply with the California Environmental Quality Act (CEQA).

b) California Endangered Species Act

The California Endangered Species Act (CESA) allows DFG to authorize project proponents to take state-listed threatened, endangered, or candidate species if certain conditions are met. DFG administers the incidental take provisions of CESA to ensure regulatory compliance and statewide consistency.

This act aims to protect species of fish, wildlife, and plants that are in danger of, or threatened with, extinction because their habitats are threatened with destruction, adverse modification, or severe curtailment, or because of overexploitation, disease, predation, or other factors.

3. U.S. Army Corps of Engineers 404 Permit

Section 404 of the Clean Water Act regulates the discharge of dredged, excavated, or fill material in wetlands, streams, rivers, and other U.S. waters. The USACE is the federal agency authorized to issue Section 404 Permits for certain activities conducted in wetlands or other U.S. waters. Depending on the scope of the project and method of construction, certain farming activities may require this permit. Examples include ponds, embankments, and stream channelization.

a) Jurisdiction

1) <u>Tidal Waters of the U.S.</u> The landward limits of jurisdiction in tidal waters:
Extends to the high tide line, or when adjacent non-tidal waters of the United States are present, the jurisdiction extends to the limits identified for Non-Tidal Waters of the U.S.

2) Non-Tidal Waters of the United States. The limits of jurisdiction in non-tidal waters:
In the absence of adjacent wetlands, the jurisdiction extends to the ordinary high water mark, or when adjacent wetlands are present, the jurisdiction extends beyond the ordinary high water mark to the limit of the adjacent wetlands. When the water of the United States consists only of wetlands the jurisdiction extends to the limit of the wetland.

b) Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403) prohibits the obstruction or alteration of navigable waters of the United States without a permit from the Corps of Engineers. All Structures and Work - dredging, marinas, piers, wharves, floats, intake/outtake pipes, pilings, bulkheads, ramps, fills, overhead transmission lines, etc.

4. U.S Environmental Protection Agency

The USACE jointly administers Section 404 authority with the USEPA, the administering agency for the entire CWA, and receives oversight support from the USFWS. Under a Memorandum of Agreement (MOA) between the USEPA and the Department of Defense (DOD), the USACE is given sole responsibility for making final permit decisions pursuant to Section 404 and, "conducts jurisdictional delineations associated with the day-to-day administration of the Section 404 program" (U.S. Department of Agriculture 1996). The USEPA retains the authority to enforce compliance with Section 404 and maintains the power to overrule USACE decisions on the issuance or denial of permits (U.S. Environmental Protection Agency 1995). If there is a dispute about whether an area can be regulated, the USEPA has the ultimate authority to determine the actual geographic scope of waters of the United States subject to jurisdiction under all sections of the CWA, including the Section 404 regulatory program (U.S. Department of Agriculture 1996).

5. NOAA-NMFS

CWA Section 404. The Act provides NOAA authority to comment on permit applications for the purpose of avoiding, minimizing, and mitigating the destruction and degradation of aquatic resources, including wetlands.

Endangered Species Act (ESA). The ESA provides for the designation and protection of invertebrates, wildlife, fish, and plant species that are in danger of becoming extinct and conserves the ecosystems on which such species depend. The National Marine Fisheries Service (NMFS) deals with actions affecting marine species. Section 7 of the ESA requires Federal agencies to consult with NMFS to insure that any action authorized, funded, or carried out by such agency is not likely to jeopardize the continued existence of any endangered species or threatened species or adversely modify or destroy designated critical habitat. Following consultation under Section 7, a biological opinion is issued.

The Magnuson-Stevens Fishery Conservation and Management Act (MSA). The 1996 amendments to the MSA established a new mandate for the NMFS, regional fishery management councils (FMC), and other Federal agencies to identify and protect important marine and anadromous fish habitat (Essential Fish Habitat or EFH), including wetlands. The EFH provisions of the MSA support one of the Nation's overall marine resource management goals - maintaining sustainable fisheries. Federal action agencies which fund, permit, or carry out activities that may adversely impact EFH are required to consult with NMFS regarding the potential effects of their actions on EFH. When NMFS finds that an action may adversely affect EFH, NMFS is required to provide the action agency with conservation recommendations to protect EFH.

6. US Fish and Wildlife Service (FWS)

The ESA provides for the designation and protection of invertebrates, wildlife, fish, and plant species that are in danger of becoming extinct and conserves the ecosystems on which such species depend. ESA Section 7 requires Federal agencies to insure that any action authorized, funded or carried out by them is not likely to jeopardize the continued existence of listed species or modify their critical habitat.

Migratory Bird Treaty Act (MBTA). The MBTA provides that it is unlawful to pursue, hunt, take, capture, kill, possess, sell, purchase, barter, import, export, or transport any migratory bird, or any part, nest, or egg or any such bird, unless authorized under a permit issued by the Secretary of the Interior. Some regulatory exceptions apply. Take is defined in regulations as: "pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to pursue, hunt, shoot,

wound, kill, trap, capture, or collect." The MBTA protects over 800 species of birds that occur in the U.S.

Bald and Golden Eagle Protection Act (1940) protects eagles from commercial exploitation and safeguards their continued survival in the United States. This law provides for the protection of the bald eagle (the national emblem) and the golden eagle by prohibiting, except under certain specified conditions, the taking, possession and commerce of such birds.

7. Regional Water Quality Control Board (RWQCB)

The Water Board is a State agency with regional jurisdiction over the bed and banks of stream channels, their riparian corridors and the beneficial uses. Santa Clara County is under the jurisdiction of the San Francisco Bay and Central Coast Regions. The RWQCB's purpose is to protect and improve the quality of the natural water resources in the region. Regional resources include San Francisco and Tomales Bays, the Ocean, streams that flow into the Bays and Ocean, and groundwater throughout the region. Protecting water quality is achieved by regulating discharges to the waters and by requiring cleanups of unplanned or illegal discharges. The regulating of discharges is done through a variety of permits. Permits issued by the Water Board put restrictions on discharges of wastes, such as concentrations of certain pollutants, or the amount of flow. Permits can also require dischargers to take certain kinds of actions; for example, installing certain technologies to treat or contain wastes, or implementing practices to manage stormwater.

The Porter-Cologne Act also assigns responsibility for implementing CWA Sections 303, 401, and 402 to the SWRCB and RWQCBs. Under Section 303, the RWQCBs, in conjunction with USEPA, are responsible for developing and implementing TMDLs to address water quality impairments.

1.13. Reference Documents

Detailed information of the SMP and permit conditions can be found in the following documents:

1. Final Environmental Impact Report (FEIR) for the 2012 Stream Maintenance Program, *date*.
2. San Francisco Bay Regional Water Quality Control Board (RWQCB-SF) Order ---------- specifying Waste Discharge Requirements and Clean Water Act Section 401 Water Quality Certification *dated*.
3. Central Coast Region Regional Water Quality Control Board (RWQCB-CC) Order ---------- specifying Waste Discharge Requirement and Clean Water Act Section 401 Water Quality Certification *dated*.
4. 2012 Stream Maintenance Program Biological Assessment, Santa Clara Valley Water District, *date*.
5. Sediment Characterization Plan for the San Francisco Bay Region 2012 Stream Maintenance Program, *date*.
6. Water Quality Sampling Plan For the San Francisco Bay Area Region, 2012 Stream Maintenance Program, *date*.
7. Sediment Characterization Plan for the Central Coast Region 2012 Stream Maintenance Program, *date*.
8. Water Quality Sampling Plan for Central Coast Region, 2012 Stream Maintenance Program, *date*.

2. VEGETATION MANAGEMENT

The Vegetation Management Program is designed to maintain the hydraulic and safety functions of the District's creek and canal systems, and stream gauges; through the control and management of vegetation, while improving creek ecosystems. (Please see the Canal Maintenance chapter for the description of additional work in canals.)

Vegetation management is necessary to achieve various facility management goals. Specifically, vegetation has the ability to: restrict hydraulic capacity and impede flow conveyance, negatively impact water quality, and create fire hazards due to high fuel loads. Non-native vegetation may also have negative ecological impacts as it can out-compete more desirable native species, resulting in habitat alteration and reduced biodiversity. The District uses an integrated approach for vegetation management to ensure the most effective technique is used in a manner that minimizes impacts to the environment.

This chapter describes specific types of vegetation management that are considered to be routine maintenance activities. The program is separated between woody and herbaceous vegetation management, though there are overlaps. For simplicity, the words "woody" and "tree" will refer to both trees and shrubs.

There are five projected vegetation management activities that are described for the program period 2012-2022. These include pruning, hand removal, herbicide, mowing, and discing activities. Multiple work activities can be used to achieve any one purpose of the program depending upon the location, time of season, goal to be accomplished, and sensitivity of the resources.

Work activities are permitted throughout the program area. SMP 2002 projected areas have been mitigated for in perpetuity. All other "new" work area impacts will be assessed annually, calculating the necessary mitigation per the requirements in the Mitigation Approach Memorandum, Appendix C FSEIR ~~chapter~~.

The Vegetation Management chapter has the following sub-sections:

2.1 Woody Vegetation Management
- 2.1.1 Routine Pruning
- 2.1.2 Corrective Pruning
- 2.1.3 Coppicing
- 2.1.4 Hand Removal
- 2.1.5 Invasive Plant Management Plan~~Program~~

2.1.6 Large Woody Debris

2.2 Herbicide and Mechanical

2.2.1 Herbicide

2.2.2 Mowing

2.2.3 Discing

2.2.4 Flaming

2.2.5 Grazing

2012 Projected Vegetation Management Work Type by Watershed (in miles)

Watershed	Hand Removal	Herbicide	Pruning	Mowing	Discing
Santa Clara Basin					
Lower Peninsula	2.5	47.8	22.7	3.8	0
West Valley	3.2	146	61.7	32.6	0
Guadalupe	6.9	277.7	211.6	146.8	.4
Coyote	88.6	213.4	159.5	58.3	.5
Pajaro Basin					
Pajaro	49.7	162	156.6	45.9	.9
Total	150.9 miles	846.9 miles	612.1miles	287.4 miles	1.8 miles

Note:

1. ~~Acreages~~ Miles are shown for the total projection of each work activity type. This includes acreages for overlapping work activities at the same location, so potential impacts are over represented.
2. ~~Acreages~~ Miles incorporate the work area percentage estimate to account for varying work amounts within a reach.

Channel Access and Staging

Access to maintenance sites will occur via existing, adjacent access roads where present. Most SCVWD-maintained channels have at least one existing access road running along the top-of-bank on one side of the channel. Some channels have an access road on either side of the channel; and others may have a lower maintenance road along the lower level banks. When the channel shape, bank height, or the presence of mature vegetation prevents the use of the top-of-bank access roads,

equipment can move down the channel slope via existing access ramps, or forge a new temporary access route. Selective clearing of shrubs or trees may be necessary on the banks to provide equipment access to the channel bed.

Access to vegetation maintenance sites typically occurs via the adjacent access road to the general location, if present, and by foot into the channel or other areas without access roads. Staging for maintenance activities will occur to the extent possible on adjacent access roads and lands, if available.

Revegetation

The District assesses each revegetation site with a long-term strategy for self sufficiency. Species palette's, soil conditions, water availability, aspect, etc. are incorporated into the planting approach. The structure of species and distance relationship to various creek flows guides the revegetation specialist to choose the appropriate species for the site, considering long-term maintenance requirements both for the vegetation and for creek capacity.

ROUTINE PRUNING

2.1. WOODY VEGETATION MANAGEMENT

2.1.1. Routine Pruning

A. Purpose

Pruning of trees and shrubs is a routine activity necessary to provide access to District facilities, improve visibility to inspect District facilities, protect District infrastructure, and maintain the designed hydraulic capacity of the creek systems. Pruning is also used to maintain the facility per the facilities' O&M Guidelines. Providing an increase in design flow capacity is not permitted under this Program.

Typical woody vegetation pruning takes place along maintenance roads, fences and levee slopes. The District may trim vegetation to reduce or prevent fire hazards, in compliance with local fire codes. Tree pruning may include thinning the canopy of an individual tree or shrub. For simplicity, the term "tree" or "trees" will refer to both trees and woody shrubs.

Definitions

1. Pruning is the cutting of a branch ≤ 4” in diameter.
2. Herbaceous - non-woody vegetation includes grasses, broadleaf weeds, cattails, and bulrush; and annuals, biennials, and perennials.
3. Shrub - woody plant smaller in height than a tree (< 15 feet [4.6 meters] at maturity), often formed by a number of vertical or semi-upright branches arising close to the ground.
4. Tree - a species of woody perennial that typically has one dominant vertical trunk and a height greater than 15 feet (4.6 meters) in its natural, mature form. There are some tree species exceptions.

B. Work Activity

Pruning is the partial removal of any individual plant and includes cutting of tree branches, woody and herbaceous vegetation, and is conducted with mechanized and non-mechanized hand tools. Pruning may occur in in-stream and along bank bench areas.

C. Work Projections

Pruning is a projected activity. Work that is conducted in areas not originally projected as “upland over hanging growth (OHG)” in 2002, will require mitigation as described in the 2012 SMP FSEIR, and included in the Mitigation Approach Memorandum, Appendix C FSEIR ~~chapter of this Manual~~. Pruning impacts will not exceed 40 acres over the 10-year Program period. Work projected in the 2002 SMP has been mitigated for in perpetuity, will continue to have work performed in these areas, and will not need to calculate impacts annually.

D. Work Window

Vegetation management activities may occur:

1. In-stream (wetted area) hand pruning and hand removal may occur year round, except:
   a) Where ~~large~~ mechanized equipment would need to access the site by crossing a creek or otherwise affect water quality, or
   b) In steelhead streams, where work is only permitted until December 31 or until signficant~~local~~ rainfall greater than 0.5 inches falls within

the subject watershed within a 24-hour period, whichever transpires first.

2. Vegetation management outside the bankfull channel (see section 2.1.6 for definition) may be performed year round.
   a) Year round work opportunities do not apply to areas where ~~large~~ mechanized equipment would need to access the site by crossing a creek or otherwise affect water quality.
3. Due to separate project permits and/or CEQA/NEPA requirements, individual sites may have additional limitations on work types and work windows. Where these modified conditions occur they will be incorporated into the Stream Maintenance Program.

E. Requirements

Pruning can invigorate trees and stimulate new growth. Improperly pruning a tree or shrub can create more work the following year(s); e.g. as when multiple, weakly attached stems sprout from a stub cut.

The following pruning standards should be used:

1. Pruning will be done by qualified staff in a manner that will achieve the maintenance goals of the facility while preserving the short and long term health of the vegetation.
2. Pruning standards should be performed according to national American National Standards Institute (ANSI) A300 (Part 1) 2008 Pruning, ANSI Z133.1 – 2000 Safety Requirements and International Society of Arboriculture (ISA) Best Management Practices Tree Pruning (revised 2008) or the most current updates.
3. Limbs ≤ 4” in diameter may be removed as routine work under the SMP.
4. Limbs > 4” may also require removal due to access for bank stabilization and sediment projects, to reduce debris accumulation, and to minimize potential flooding. There are occasions whereby removing limbs from a fallen tree may be sufficient to maintain flow conveyance in lieu of complete tree removal.
   a) The following criteria will be used for lateral pruning:
      Pruning will be prescribed and marked by an ISA Certified Arborist or those experienced and knowledgeable in ISA pruning standards.
5. When possible, pruning should be done during the winter when vegetation is dormant.

F. Applicable BMPs

Vegetation Management BMPs are listed in Attachment F. These BMPs may be revised on an annual basis based on actual experience and site conditions.

2.1.2. Corrective Pruning

CORRECTIVE PRUNING

A. Purpose

Corrective pruning is performed to promote long-term woody vegetation and tree health. Corrective pruning may occur to address defects that would eventually result in whole tree failure such as: co-dominant leaders; decayed or diseased limbs; extensive branch dieback; incorrect past pruning; or injury due to storm or mechanical damage. Corrective pruning may occur where a potential hazard exists yet complete removal of a tree is unwarranted. It may also be used to adhere to proper pruning standards. For example, in order to avoid leaving a large stub and promoting unwanted re-sprouting, pruning a lateral branch away from a maintenance road may be extended to the trunk of the tree. Correcting and pruning lateral branches is also important to reduce the risk of debris trapping in the channel, particularly near the active bankfull channel (see section 2.1.6 for definition).

Corrective pruning should not be used as justification to do more work than is necessary or would otherwise be permitted. In some cases, cutting a lateral mid-way may be an appropriate place to support or regenerate growth upward.

B. Work Activity

Corrective pruning is the partial removal of any individual plant and includes cutting of tree branches, woody and herbaceous vegetation, and is conducted with mechanized and non-mechanized hand tools. Unlike routine pruning, corrective pruning is striving to correct an injury, disease, past damage, or preventative measures of future damage to facilities.

Pruning may occur in in-stream and along bank bench areas.

C. Work Projections

Corrective pruning is not a projected work activity and may occur throughout the SMP program area; although all corrective pruning must be prescribed by an ISA Certified Arborist.

D. Work Window

Vegetation management activities may occur:

1. In-stream (wetted area) hand pruning and hand removal may occur year round, except:
   a) Where ~~large~~ mechanized equipment would need to access the site by crossing a creek or otherwise affect water quality, or
   b) In steelhead streams, where work is only permitted until December 31 or until significant~~local~~ rainfall greater than 0.5 inches falls within the subject watershed within a 24-hour period, whichever transpires first.

2. Vegetation management outside the bankfull channel (see section 2.1.6 for definition) may be performed year round.
   a) Year round work opportunities do not apply to areas where ~~large~~ mechanized equipment would need to access the site by crossing a creek or otherwise affect water quality.

3. Due to separate project permits and/or CEQA/NEPA requirements, individual sites may have additional limitations on work types and work windows. Where these modified conditions occur they will be incorporated into the Stream Maintenance Program.

E. Requirements

1. All corrective pruning is performed according to national ANSI A300 (Part 1) 2008 Pruning, ANSI Z133.1 – 2000 Safety Requirements and International Society of Arboriculture (ISA) Best Management Practices Tree Pruning (revised 2008) or the most current updates.

2. Corrective pruning will be prescribed and marked by an ISA Certified Arborist or those experienced and knowledgeable in ISA pruning standards and successful corrective pruning.

3. In general, no more than 25% of an individual tree would be removed in one season. Rare cases may occur, however, such as the removal of a co-dominant leader.

4. Removal of limbs greater than 4" diameter may be necessary, and arboricultural justification will be provided.

5. Whenever possible, corrective pruning should be done during the winter when vegetation is dormant.

F. Applicable BMPs

Vegetation Management BMPs are listed in Attachment F. These BMPs may be revised on an annual basis based on actual experience and site conditions.

2.1.3. Coppicing

COPPICING

A. Coppicing Purpose

Coppicing creates annual "sucker" growth that may be desirable as cutting material for direct installation in mitigation projects. Willow species, mulefat and coyote brush are typically chosen. The trees that are chosen are trees that would normally be targeted for complete removal. After cutting the tree back to the ground, rather than treat the remaining stump with herbicide, the tree is instead left to re-sprout and provide an ongoing cutting source for individual watersheds. Select individuals within each of the major watersheds can be dedicated to this activity.

B. Work Activity

Coppicing of trees or shrubs entails severely pruning an entire woody plant near the ground to promote multi-stemmed re-growth. This action will change the plant form from a tree to a shrub, thus, increasing variability of canopy architecture and age. Coppicing typically uses hand-held and

small mechanical tools. Larger equipment may be necessary to remove the vegetation from the channel, to then be hauled away.

C. Work Projections

Coppicing is not a projected activity and may occur throughout the ~~County~~program area.

D. Work Window

Vegetation management activities may occur:

1. ~~A.~~In-stream (wetted area) hand pruning and hand removal may occur year round, except:
   a) Where ~~large~~ mechanized equipment would need to access the site by crossing a creek or otherwise affect water quality, or
   b) In steelhead streams, where work is only permitted until December 31 or until significant~~local~~ rainfall greater than 0.5 inches falls within the subject watershed within a 24-hour period, whichever transpires first.

2. ~~B.~~Vegetation management outside the bankfull channel (see section 2.1.6 for definition) may be performed year round.
   a) Year round work opportunities do not apply to areas where ~~large~~ mechanized equipment would need to access the site by crossing a creek or otherwise affect water quality.

3. ~~C.~~Due to separate project permits and/or CEQA/NEPA requirements, individual sites may have additional limitations on work types and work windows. Where these modified conditions occur they will be incorporated into the Stream Maintenance Program.

E. Requirements

Trees that would otherwise need to be removed may be good candidates to be coppiced. All work is done after appropriate pre-construction biological surveys have been performed and appropriate regulatory clearances obtained.

F. Applicable BMPs

Vegetation Management BMPs are listed in Attachment F. These BMPs may be revised on an annual basis through the Lessons Learned meetings, based on actual experience and site conditions.

HAND REMOVAL

2.1.4. Hand Removal

A. Purpose

Live, standing trees and shrubs may be removed from District facilities to meet one of the following program objectives: maintain design flow conveyance capacity, provide facility inspection and access, maintain the structural integrity of District facilities, and to promote overall ecological health. For simplicity, the term "tree" or "trees" will refer to both trees and woody shrubs.

Tree removals may occur anywhere in the creek cross section, including but not limited to, streams and their immediate overstory, stream banks, canals, levees, access roads and pedestrian paths, outboard areas and at bridges and culverts.

Stump treatment of removed trees is included under Hand Removal and is not defined as Herbicide work. All tree removals will assume a stump treatment with herbicide, unless otherwise noted in the Program document. Biological clearances will assume herbicide treatment unless otherwise noted on the Work Order.

1. Maintenance. Tree removals may be necessary to retain design flow conveyance capacity and to maintain creek channels. This condition usually occurs when trees on the bank have fallen into the stream or moved in such a way that the tree's new orientation impedes flows or causes debris blockages, resulting in an increased flood risk. Fallen trees also can divert streamflows into the opposite streambank increasing the erosion and flood risk. Although locations of downed trees is not predictable, this work should be considered "anticipated" due to its natural and regular occurrence.

Trees also exist in locations where their roots or branches may interfere with or undermine the integrity of District facilities. These facilities include, but are not limited to concrete linings, concrete wing walls, gabions, sacked concrete walls, streamflow gauges, storm drain outfalls, culverts, and pipes. Trees removed in these areas would likely be stump-treated with herbicide to prevent recovery and re-establishment.

Trees < 6" dbh may be routinely removed from creeks to reduce the accumulation of debris and potential flooding. Trees within 100 feet of bridges are also removed to prevent accumulation of debris on pier noses and bridge footings.

Trees < 6" dbh that are located within the 2002 SMP projections, have already been mitigated for through the 2002 SMP programmatic mitigation. Tree removals in "new" areas, will need to be assessed per project site, and mitigated for according to the requirements in the Mitigation Approach Memorandum, Appendix C FSEIR~~chapter of this manual~~.

Trees < 6" dbh in "new" work areas will be accounted for per the requirements in the Mitigation Approach Memorandum, Appendix C FSEIR ~~chapter of this document~~. Trees and shrubs 6-12" dbh will be assessed on a project specific basis per a "pay-as-you-go" program. (See Attachment C, Tree Scoring for Removal of Trees and Shrubs 6 - 12"dbh~~DBH~~ - April, 2011)

2. Bank Stabilization. Bank stabilization projects often require the installation of temporary roads and ramps to access the work area. Tree removals may be required under these circumstances when pruning will not suffice to provide clearance for maintenance vehicles and heavy equipment. An effort is made to target non-native trees where tree removal for vehicle access is required and to select an access route that avoids mature, native trees. Removal of large branches from mature trees for equipment access is evaluated carefully and avoided whenever possible.

   Tree removals will follow the requirements in the Mitigation Approach Memorandum, Appendix C FSEIR and summarized above. Trees and shrubs 6-12" dbh will be assessed on a project specific

basis per a "pay-as-you-go" program. (See Attachment C, Tree Scoring for Removal of Trees and Shrubs 6 - 12"dbh- April, 2011)

3. Ecological Health/Stewardship. In the interest of stream and land stewardship, efforts may be made to improve the health and vigor of trees on District properties through proper arboricultural and vegetation management techniques. Early detection of plant diseases and pathogens such as Sudden Oak Death and Western bark beetles, supported by BMP's that prevent movement of infected materials to additional locations, will be implemented through this Program. Removal of infected trees may be necessary to guarantee the ecological health of the greater area.

   Trees may be removed or pruned to improve both aquatic and terrestrial habitat quality by achieving the following objectives:

   To promote water resources stewardship, efforts will be made to improve the ecological health of riparian and upland woodlands on District facilities. Trees with structural defects, insect infestation, or pathogens that threaten the ecological health of the tree or woodland may be removed. Woodlands with stunted growth as a result of competition for resources may be thinned to facilitate normal growth. Prior to removal or stand thinning of trees, an assessment of the ecological health of the riparian and/or upland woodlands will be conducted and documented with written recommendations by biological or experienced ecological staff for management.

B. Work Activity

Complete removal of above ground portions of any individual plant using mechanized or non-mechanized hand tools. This category includes herbicide stump treatment, called 'cut stump' which is follow-up work from the removal of vegetation. Cut stump treatment is a paired activity to Hand Removal. Stump treatment is assumed to occur unless noted otherwise on the work order.

Hand Removal may occur where herbicide treatments have been applied to woody vegetation.

Hand removal uses small hand tools or mechanized tools such as chainsaws to cut vegetation. Cut vegetation will be transported from the channel bed to the access road by hand or by mechanical equipment such as an excavator or loader. Vegetation is chipped on site and hauled away in dump trucks/compactors. The herbicide application portion of this work activity is performed using tools such as drip cans, a spray bottle, or a paintbrush to do a topical treatment.

C. Work Window

Vegetation management activities may occur:

1. ~~a)~~In-stream (wetted area) hand pruning and hand removal may occur year round, except:
   a) Where ~~large~~ mechanized equipment would need to access the site by crossing a creek or otherwise affect water quality, or
   b) In steelhead streams, where work is only permitted until December 31 or until local rainfall greater than 0.5 inches falls within the subject watershed within a 24-hour period, whichever occurs first.

2. ~~b)~~Vegetation management outside the bankfull channel (see section 2.1.6 for definition) may be performed year round.
   a) ~~1.~~Year round work opportunities do not apply to areas where ~~large~~ mechanized equipment would need to access the site by crossing a creek or otherwise affect water quality.
   b) Except mowing, which may occur between February 1 and November 30, and discing which may occur between February 1 and October 15.

3. ~~c)~~Due to separate project permits and/or CEQA/NEPA requirements, individual sites may have additional limitations on work types and work windows. Where these modified conditions occur they will be incorporated into the Stream Maintenance Program.

D. Requirements

1. All tree removals require a biological survey and must be verified for compliance by the watershed environmental planner. In certain circumstances, the work may need to be supervised by a qualified horticultural specialist or Certified Arborist.

2. Tree removals must meet one of the purposes stated above in III, A, 1.

3. All tree removals must be coordinated with local tree ordinances.

E. Removal Criteria

Criteria for removal of trees is not based solely on whether they are native, non-native, or invasive. Non-native trees, including invasives, often provide valuable habitat functions in the absence of more desirable native vegetation. Removal of any of these trees would be evaluated using the following criteria. Please refer to Attachment C, Tree Scoring for Removal of Trees and Shrubs 6 -≤ 12 " dbh ~~the District's QEMS procedure~~ for implementation.

1. Presence or absence of adjacent vegetation of similar stature providing equivalent habitat functions such as roosting, nesting, perching, SRA, etc. Retention of non-natives (invasive or not) will be given a higher priority if other vegetation is not available to provide alternative habitat.

2. Current or documentable use by wildlife that is unlikely to be offset if the vegetation is removed. Such use would include raptor nests, evidence of use by cavity nesting species, evidence of a rookery, and similar wildlife uses.

3. Instances where the tree is providing vegetative structure (root system) to a stream bank that is likely to result in erosion if the tree is removed will be considered for pruning or thinning to retain the soil stability function.

F. Applicable BMPs

Vegetation Management BMPs are listed in Attachment F. These BMPs may be revised on an annual basis through the Lessons Learned meetings, based on actual experience and site conditions.

G. Requirements

Tree removals are a regular work occurrence and are necessary to maintain the proper function of District facilities, maintain conveyance capacity, remove debris accumulation and improve the riparian system. There are also different criteria for tree removals based on species type and location within the creek systems.

Native trees are given a higher level of consideration for preservation than non-native trees. Native tree species are ~~generally~~ more desirable and their presence is encouraged over non-native species. ~~They continue, however, to be generally undesirable on creek bottoms and some channel banks and levees.~~ Non-native species and invasive non-natives especially, are less desirable. (Please see the Invasive Plant Removal section for a description of a program designed to comprehensively address these species.) Trees, native or non-native, located within a creek channel, channel bank, or levee may require removal if flow conveyance capacity is reduced, the structural integrity is compromised, and where needed for visual inspection of levees.

Trees may be removed and accounted for on a project specific, pay-as-you-go basis. Trees < 6" dbh in "new" work areas will be accounted for per the requirements in the Mitigation Approach Memorandum, Appendix C FSEIR ~~chapter of this document~~. Trees and shrubs 6-12" dbh will be assessed on a project specific basis per a "pay-as-you-go" program. (See Attachment C, Tree Scoring for Removal of Trees and Shrubs 6 - 12"DBH - April, 2011.) This document provides a specific tree appraisal and evaluation protocol to determine how replacement planting occurs. The protocol in the Attachment C ~~Appendix~~ involves carefully assessing targeted tree removals for their existing conditions and functions, including their canopy cover, local area value, ecosystem benefits, and ecosystem detriments. Due to the sensitive habitats of native oaks and sycamores, these species will be mitigated with in-kind species.

1. Trees < 6" dbh that are located within the 2002 SMP projections.
   These trees have already been mitigated for through the 2002 SMP programmatic mitigation.

2. Trees < 6” dbh in “new” work areas.
   Tree removals in “new” areas, will need to be assessed per project site, and mitigated for according to the requirements in the Mitigation Approach Memorandum, Appendix C FSEIR~~of this manual~~.

3. Trees and shrubs 6-12” dbh will be assessed on a project specific basis per a “pay-as-you-go” program. (See Tree Scoring for Removal of Trees and Shrubs 6 - 12”DBH - April, 2011)

H. Definitions

Multi-stem: A tree or shrub with a root ball and multiple trunks or stems. This may occur at ground level or several feet above ground. The dbh of trees with multiple stems will be calculated by adding the diameters of the individual stems at 4.5 feet above ground. Individuals with greater than seven (7) stems at dbh will be assessed by their canopy cover, per the Tree Scoring for Removal of Trees and Shrubs 6 - 12”DBH - April, 2011.

2.1.5. Invasive Plant Management Plan~~Program~~ (IPMP)

Invasive plant species are frequently found during routine SMP work activities (i.e., bank repair sites, sediment removal sites and/or routine vegetation maintenance work). In these instances, opportunistic control and/or removal of invasive plants could enhance habitat quality and benefit the larger watershed landscape.

Mitigation may be acquired, on a case by case basis, for the removal of invasive non-native plant species at SMP work sites, provided the removals will enable regeneration of native plant species and/or improve the ecological function of the habitat. Mitigation credit from invasive plant removal can be used to compensate for loss of native plant species during routine maintenance activities.

Removal of herbaceous invasive species will be quantified as acreage or area removed, whereas removal of woody tree or shrub species will be determined

based upon the number of stems, diameter rank (class), invasiveness of target species, and the ecological value provided by target species at the proposed work location.

See the IPMP Attachment D~~Mitigation chapter~~ of this Manual for detailed information.

2.1.6. Large Woody Debris (LWD)

Large woody debris is recruited to the stream channel throughout the year by a variety of natural processes including bank erosion, landslides, windstorms, and tree mortality. The LWD evaluation and implementation program includes an assessment of the ecological, geomorphic and hydraulic effects (creek, canal and stream gauge functions) of LWD in the creeks of Santa Clara County. The evaluation and implementation program will balance flood protection objectives while maintaining the ecological integrity of our local streams.

The LWD program pertains to the in-stream area which is defined as the stream channel within ~~bankfull~~ ordinary high water discharge demarcations. The term ~~'bankfull'~~ ordinary high water is defined by the ACOE as that line on the shore established by the fluctuations of water and indicated by physical characteristics such as clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas. ~~as the incipient elevation on the bank where flooding begins (Rosgen, 1996).~~

A. Purpose

LWD provides an important ecological role in Santa Clara County creeks. It can also create areas of debris accumulation if not properly managed. A LWD program will be prepared to retain woody debris in streams throughout Santa Clara County in order to preserve the physical and biological processes associated with the natural recruitment of wood to waterways. This process will alter urban streams so that their behavior

corresponds as closely as possible with that of natural streams while retaining the District's ability to provide flood protection.

B. Work Activity

In order to effectively manage large woody debris in streams within the urban landscape of Santa Clara County, the District will use a four tiered, multi-disciplined approach for addressing LWD. The four tiers are: 1) Retain LWD in the channel, 2) modify LWD, 3) remove LWD and replace, and 4) remove LWD. LWD management may use an excavator, material handler, and/or crane to modify placement.

C. Work Projections

Large woody debris is not a projected work activity.

D. Work Window

LWD management will follow the same work windows as for vegetation management. Modification of these requirements may be made through the Biological Opinion of the National Marine Fisheries Service.

~~Modification and removal of large woody debris may occur at any time of the year if an imminent danger of a flood threat precludes leaving the wood in place.~~

E. Requirements

The full requirements are described in the LWD Program document, Attachment E and the Mitigation Approach Memorandum, Appendix C FSEIR. Please refer to those~~at~~ documents for implementation. ~~Below is a brief description of the program.~~ Once a determination is made and implemented, the LWD will be tagged and monitored. This information will be inputted and tracked in the District database. Mitigation for LWD is only required in creeks that support anadromous fish; though management of LWD is desired in all Santa Clara creeks.

F. Applicable BMPs

Vegetation Management BMPs are listed in Attachment F. These BMPs may be revised on an annual basis based on actual experience and site conditions.

2.2. HERBICIDE and MECHANICAL

The District's Vegetation Management Program uses an integrated approach of chemical, mechanical, cultural, and some limited biological methods to manage vegetation on its facilities. Herbicides are used in conjunction with mechanical and hand vegetation suppression to support hydraulic, fire safety, and ecosystem functions. Herbicides are used in a manner that is least disruptive to existing or potential biological resources.

Control of herbaceous vegetation in the SMP area is done for many of the same reasons as management of woody species. Herbaceous vegetation has the ability to impede flow conveyance, and create fire hazards in non-instream~~upland~~ areas outside of the channel bottom. Herbaceous vegetation may also have negative ecological impacts as it can out-compete more desirable native species, resulting in habitat degradation. For the purposes of the SMP, herbaceous vegetation is non-woody vegetation which includes grasses, broadleaf weeds, cattails, and bulrush. Herbaceous vegetation includes annual, biennial, and perennial plant types.

Herbaceous vegetation control is performed to limit weed growth, seeding and expansion into new areas, to reduce weeds in areas of special management (mitigation sites), maintain road right-of-ways and firebreaks along top of bank, prevent vegetation encroachment by herbaceous plants, maintain vegetation free areas as buffers, and to provide localized treatments needed to protect facilities and resources.

Guiding Principles

The goal of SMP vegetation management is to achieve the desired control while balancing environmental and economic considerations. Herbicides, while often the most effective economically, are routinely dismissed for some applications due to other factors that make their use in a given situation inappropriate. In the same context, herbicides used appropriately are, in many cases, the most environmentally desirable method for achieving the desired level of vegetation control. The selection of an approved herbicide, coupled with the use of an appropriate surfactant per label recommendations can provide a higher level of control which may reduce the frequency needed to service an area, while also minimizing physical impacts to the site. Targeted use of herbicides may eliminate the need to bring in heavy mowing equipment or large hand crews that can be more disruptive to on-site biological resources. For example, rather than coming in annually to control a specific area, you may be able to reduce the return time to every two years.

2.2.1. Herbicide

A. Purpose

Herbicides are applied in areas where the presence of the herbaceous vegetation is in conflict with the maintenance standards of the facility. Herbicides are also routinely used to treat cut stumps after Hand Removal activities to prevent re-sprouting (described above). The use of herbicide for cut-stump treatment is a paired activity with Hand Removal. Post-emergent herbicides are applied to manage fire breaks in areas at the top of bank.

B. Work Activity

The application of herbicide occurs in-stream and on bank bench areas as well as on maintenance roads, outboard levee slopes, and similar non-instream areas. Herbicide describes a work activity and not the formulation used. This activity consists of using herbicide as the primary abatement tool to kill vegetation and provide subsequent follow-up for hand removal activities.

All herbicide applications are performed using equipment appropriate to the specific application type. Instream herbicide application may use a hose and hand gun with a directed stream, or a backpack unit for smaller isolated areas.

On unpaved access roads, herbicides would be sprayed from a truck-mounted boom to control weeds in order to allow maintenance access and provide firebreaks. The booms have multiple nozzles that are specifically calibrated to provide the dosage and spray pattern appropriate to the area. The application is managed from an on-board computer mounted in each spray rig. During the application, roads are posted closed

to notify the public of the application and remain so until the application dries to reduce the risk of incidental exposure.

Hand Removal 'cut-stump' applications are topical herbicide applications as a follow-up activity to Hand Removal and are considered paired activities. Therefore, cut-stump applications are not defined as Herbicide. 'Cut-stump' applications are applied using topical equipment, such as a spray bottle, paintbrush, or "drip bottle". Hand Removal may occur where herbicide treatments have been applied to woody vegetation.

C. Work Projections

Herbicide usage is a projected work activity under Herbicide. Hand Removal may occur where Herbicide treatments have been applied to woody vegetation. Hand Removal may be substituted in areas where Herbicide has been projected. Pay-as-you-go vegetation removal is accounted for separately.

Work that is conducted in areas not originally projected in 2002, will require mitigation as described in the Mitigation Approach Memorandum, Appendix C, 2012 SMP FSEIR~~, and included in the Mitigation chapter of this Manual~~. Work projected in the 2002 SMP has been mitigated for in perpetuity, will continue to have work performed in these areas, and will not need to calculate impacts annually.

D. Work Window

1. In-stream herbicide use is a projected work activity and may occur between June 15 - October 15.

2. In-stream work may continue from October 16 until December 31 or until local rainfall greater than 0.5 inches falls within the subject watershed within a 24-hour period, whichever transpires first.

3. Bank bench herbicide work may occur year round, weather permitting and per the product label.

E. Requirements

1. All herbicide usage must have the appropriate biological surveys and clearances.

2. All herbicide applications must have a Pest Control Recommendation provided by a California licensed Pest Control Advisor. A recommendation is provided after each site is surveyed and the most appropriate control methods for the site are determined.

3. Foliar applications to woody vegetation are limited to under two (2) inches dbh and typically less than eight (8) feet in height.

4. Herbicide use is permitted in non-instream (bank/bench)~~upland~~ areas.

5. Herbicide use is permitted year-round on in-stream concrete sections (e.g. weep holes, expansion cracks) in dry channels.

6. Unmodified streams, as defined per the maps in this document, ~~have the following limitations~~may perform the following work activities:
   a) Pre-emergent herbicides are permitted in non-instream (bank/bench)~~upland~~ areas outside of the channel banks.
   b) Post-emergent herbicides may be applied in aquatic habitats to control non-native and invasive plant species.
   c) Post-emergent herbicides may be applied outside the wetted channel (inboard slope, bank bench, and outboard slope) to control vegetation for fuel management, maintenance access and ecological requirements.
   d) Additional biological and pest control recommendations may be required to protect sensitive species and their habitats.

7. Herbicides may be permitted in serpentine areas when approved by a qualified plant biologist and with the incorporation of measures to protect sensitive biological resources, as appropriate.

   Considerations for herbicide use in serpentine areas:
   a) Maintain the designed function of the facility,
   b) Management for control of invasive and non-native plants, and
   c) Protection of sensitive species and habitat.

8. Aquatic herbicide can only be used in California red-legged frog and California tiger salamander SMP mapped areas when the creek is dry and no rain is forecast for the next 48 hours.

9. The use of surfactants on the 14 steelhead streams are permitted when:
   a. The stream is dry in the immediate work location and no rain is forecast for the next 24 hours.
   b. Spot spraying is necessary to control undesirable vegetation (eg. invasive non-native vegetation or vegetation that falls outside the acceptable maintenance design of the facility).
   c. Foliar spray work is a method necessary to maintain channel capacity per the engineering standards for the following facilities and locations:
      1) Stevens Creek from Highway 101 to L'Avenida Avenue
      2) Guadalupe River:
         i. Reach G thru B (500' downstream UPRR bridge to Highway 101)
         ii. Branham Lane to Guadalupe Creek/Alamitos Creek confluence
      3) Alamitos Creek (Guadalupe River confluence to Coleman Road)
      4) Los Gatos Creek (South Bascom Avenue upstream to Camden; and Hwy 85 to Lark Avenue)
      5) Uvas Creek (Bloomfield Rd upstream to Santa Teresa Boulevard)
      6) Llagas Creek (confluence with the Pajaro River upstream to Santa Teresa Boulevard).

10. Surfactants are permitted adjacent to steelhead streams when a 20 foot buffer is established between the treatment area and the wetted flow channel.

F. Applicable BMPs

Vegetation Management BMPs are listed in Attachment F. These BMPs may be revised on an annual basis through the Lessons Learned meetings, based on actual experience and site conditions.

G. Aquatic Herbicides and Surfactants

Only herbicides and surfactants that have been approved for aquatic use by the EPA and are registered for use by the CDPR will be used for SMP aquatic vegetation control work. The lowest recommended rate to achieve project objectives of both herbicides and surfactants will be utilized to achieve desired control. An indicator dye may be added to the tank mix to help the applicator identify areas that have been treated and better monitor the overall application.

Surfactants

Surfactants are a separate category of materials that are added to herbicide mixtures to enhance their performance. The surfactant may assist with spreading over the vegetation, sticking to the foliage, penetrating thick cuticles or other activities that increase the efficacy of the application. Most aquatic herbicides either require or highly recommend the use of a surfactant to achieve reasonable levels of control. In instances where surfactants are absent from the tank mix, the level of control is often reduced. A reduction in control causes a greater return frequency which translates to more herbicide being used in the system and more frequent disturbance to the site.

MOWING

Surfactant use will be limited to the products which are documented to have the least toxic affect to aquatic life. Currently, Agridex and Hasten (also known as Competitor) are documented as the least toxic in the NOAA 2006 Supplemental Environmental Assessment of NOAA Fisheries Implementation Plan for the Community Based Restoration Program. (NOAA Restoration Center. Silver Springs, MD). As new technologies and chemistry becomes available, the District will evaluate its program and adopt materials that achieve optimum control while affording the best protection to environmental resources. The District has a series of QEMS Documents, including– Q751D02 - Control and Oversight of Pesticide Use that define the processes for modifications to the Herbicide program.

2.2.2. Mowing

A. Purpose

Mowing provides visual access for facility inspections and may be required for flow conveyance capacity and to meet local fire codes. Local

fire codes call for all weeds and grasses to be maintained below 6” in height for 10’ horizontally on both sides of access routes. Vegetation must be cut back 30’ around any structures and a 30’ firebreak must be maintained. Parcels up to one acre in size must be completely mowed. All work is performed to conform to local fire code requirements. Mowing is the area-wide cutting of above ground plant material by mechanized or hand-held equipment. Work primarily occurs in the bank bench/outboard areas; though may also be tidally influenced if the area is near the Bay.

B. Work Activity

Area-wide cutting of above ground plant material using a tractor mounted flail mower or hand-held equipment (weed-eaters). Work primarily occurs in the bank bench/outboard areas; though may also be tidally influenced if the area is near the Bay.

C. Work Projections

Mowing is a projected work activity. Areas currently managed by discing may be added to the mowing program if discing is deemed an undesirable management method. Work that is conducted in areas not originally projected in 2002, will require mitigation as described in the Mitigation Approach Memorandum, Appendix C, 2012 FSEIR~~2012 SMP FEIR, and included in the Mitigation chapter of this Manual~~. Work projected in the 2002 SMP is part of the original program, and will continue to have work performed in these areas, and will not need to calculate impacts annually.

D. Work Window

Mowing may occur from February 1st to November 30th.

E. Requirements

All standard procedures for biological clearances apply. Since much of this work is performed by contractors, annual Best Management Practice (BMP) training is required and BMP checklists shall be completed daily by the contractor.

F. Applicable BMPs

BMPs are listed in Attachment F. These BMPs may be revised on an annual basis through the Lessons Learned meetings, based on actual experience and site conditions.

DISCING

2.2.3. Discing

A. Purpose

Discing is another tool used for herbaceous vegetation control. Discing is the area-wide removal of above ground herbaceous plant material by tilling the soil using a disc. All work is performed to conform to local fire code requirements.

B. Work Activity

Discing is the removal of above ground herbaceous plant material in a defined area, by tilling the soil using a tractor drawn disc or similar implement. Discing is performed in non-instream areas.

C. Work Projections

Discing is a projected work activity. Work that is conducted in areas not originally projected as mowing in 2002, will require mitigation as described in the Mitigation Approach Memorandum, Appendix C, ~~the~~ 2012 SMP FSEIR~~, and included in the Mitigation chapter of this Manual~~. Work projected in the 2002 SMP is part of the original Program, and will continue to have work performed in these areas, and will not need to calculate impacts annually.

D. Work Window

Discing may occur from February 1 – October 15.

E. Requirements

All standard procedures for biological clearances apply.

F. Applicable BMPs

BMPs are listed in Attachment F. These BMPs may be revised on an annual basis through the Lessons Learned meetings, based on actual experience and site conditions.

FLAMING

2.2.4. Flaming

A. Purpose

A hand-held propane gas-powered flamer may be used to control weed seedlings. Operation of a flamer is a useful alternative when non-target plants have known sensitivity to herbicide drift. It may also be useful in deterring annual exotics from invading a native, perennial habitat type, as when poison hemlock or perennial peppergrass seedlings invade a temperate Pacific tidal salt or brackish marsh.

B. Work Activity

A flamer is a gas powered hand-held wand that delivers a directed torch flame fueled by a propane canister. An individual would walk the project site carrying the flamer. Cell contents of the weed expand with the heat in a few seconds, bursting cell walls, leaving the plant wilted. Steam, not smoke, is the by-product. Upright, broad-leaved weeds from ½ to 1 inch tall are most effectively controlled by this method; grasses or rosettes are more difficult. If the ground substrate is flammable [e.g. wood mulch, leaf litter], it should be wet or moist when flamed. Non-flammable substrates such as rocked maintenance roads, cellular concrete mat [CCM], driveways, sidewalks, concrete floodwall seams, gabions [check the wire tolerance], gravel bars, marshes, weepholes and expansion joints in concrete line

creeks, canals or spillways, etc. are ideal for this tool. Smooth substrates allow even application of heat; rough surfaces allow weeds to evade the torch effects.

C. Work Projections

Use of a flamer is not a projected work activity and is permitted throughout the program area.

D. Work Window

Work may occur year round, though usually occurs between October and February, weather permitting.

E. Requirements

All standard procedures for biological clearances apply. Flamers shall be used only by trained qualified staff in strict compliance with all applicable regulations. Flamers shall not be used during periods of high fire danger or in areas where fuel or climate conditions could cause an accidental fire. Local fire districts may request notification prior to use.

F. Applicable BMPs

BMPs are listed in Attachment F. These BMPs may be revised on an annual basis through the Lessons Learned meetings, based on actual experience and site conditions.

GRAZING

2.2.5. Grazing

A. Purpose

In limited circumstances, grazing may be used for herbaceous weed control on District facilities. Grazing uses various species of domestic animals to provide non-targeted weed control. Animals include goats, sheep and other appropriate animals. Larger scale grazing by cattle is normally not appropriate for District facilities.

B. Work Activity

Small herds are put on parcels after evaluation by biological staff to identify sensitive resources. Vegetation to be preserved is fenced off as a protective measure. Grazing is excluded from channels and other water resources. If a sensitive water body is within the grazing area, it will be excluded with fencing.

C. Work Projections

Grazing is not a distinct projected work activity as it is permitted where mowing, discing, herbicide, or non-instream hand removal is projected. Grazing is permitted year round though it is typically done in the spring and summer when vegetation is young and still palatable to the livestock.

D. Work Window

Work may occur year round.

E. Requirements

All standard procedures for biological clearances apply.

F. Applicable BMPs

BMPs are listed in Attachment F. These BMPs may be revised on an annual basis based on actual experience and site conditions.

3. SEDIMENT REMOVAL

A. Purpose

Sediment removal is the act of mechanically removing sediment deposited within a creek or canal. Sediment removal is necessary when an accumulation of sediment: (1) reduces flow conveyance capacity; (2) prevents facilities or appurtenant structures from functioning as intended; or (3) impedes fish passage and access to fish ladders. The District's purpose in performing sediment removal activities is to ensure that a creek or canal will continue to provide flood capacity and that appurtenant facilities will function as designed. ~~During the first nine (9) years of the SMP, 2002-2010, the average length of a sediment job was 1643 feet; removing an average of 661 cubic yards of sediment annually.~~[1]

Please refer to the Canal Maintenance section for work in canals.

B. Work Activity

Sediment may be removed from creek channel beds and canals with various pieces of equipment, including but not limited to excavators, long-reach excavators, bulldozers, scrapers, or front-end loaders. Sediment removal is usually conducted from the top-of-bank using one or more excavators. If the channel shape or the presence of mature vegetation along the channel banks prevents working from the top-of-bank, then the excavator may be positioned lower on the channel banks or within the channel bed using an existing access ramp, if available. Working within the channel may require the construction of temporary access ramps. Where practicable and necessary, smaller equipment can be lowered directly into the channel from a nearby stream crossing to minimize impacts associated with sediment removal operation. For smaller scale localized sediment removal or culvert clearing projects small loaders or excavators may be used within the culvert. Once excavated, sediment is typically either placed directly into dump trucks parked on the access road or stockpiled into central locations along the channel, where another operation subsequently lifts the stockpiled material into adjacent dump trucks.

Channel Access and Staging

Access to maintenance sites will occur via existing, adjacent access roads where present. Most SCVWD-maintained channels have at least one existing access road running along the top-of-bank on one side of the channel. Some channels have an access road on either side of the channel; and others may have a lower maintenance road along the lower level banks. When the channel shape, bank height, or the presence of mature vegetation prevents the use of the top-of-bank access roads, equipment can move down the channel slope via existing access ramps, or forge a new temporary access route. Selective clearing of shrubs or trees may be necessary on the banks to provide equipment access to the channel bed.

In the event that work will be performed within the channel bottom, all work will be performed in dry conditions or within an area dewatered by a stream flow bypass system.

C. Work Projections

Sediment removal is a projected work activity. During the first nine years of the SMP (2002-2010), the District removed an average of 42,088 cubic yards of sediment in the Santa Clara Basin and 1,376 cubic yards from the Pajaro Basin each year. The total linear extent of sediment removal activity, including repeated work areas, was 56.25 miles of creeks, with 52.12 miles of work in the Santa Clara Basin and 4.13 miles in the Pajaro Basin from 2002-2009.

1. Projection Estimates

Sediment removal projections for the 2012-2022 work period are listed below per watershed. It is projected that 35.4 miles and 7.4 miles of sediment removal work will occur in the Santa Clara and Pajaro basins respectively during the 2012-2022 period.

Sediment Removal Projections for 2012 - 2022

Watershed	2012–2022 Total Projected Sediment Removal (miles)*	New Work Areas for 2012–2022 (miles)	Work Areas from 2002–2012 Not Projected for 2012–2022 (miles)
Santa Clara Basin			
Lower Peninsula	3.9	0.7	2.6
West Valley	3.8	0.9	8.3
Guadalupe	11	8.7	0
Coyote	16.7	5.9	0.7
Pajaro Basin			
Pajaro	7.4	3.1	3.5
Total	42.8 miles	19.3 miles	15.1 miles

~~2. Work Projection Management~~

~~Sediment removal can be performed in any stream under District jurisdiction, even when a location is not included in the projected work area, if documentation can be shown that:~~

~~a) The work is consistent with the Facility Maintenance Guidelines,~~
~~b) The work is needed to maintain the flood conveyance capacity but does not increase the designed flood conveyance capacity, and~~
~~c) Work is not specifically excluded in the SMP.~~

~~Work that is conducted in areas not originally projected in 2002, will require mitigation as described in the 2012 SMP FEIR, and included in the Mitigation chapter of this Manual. Work projected in the 2002 SMP has been mitigated for in perpetuity, will continue to have work performed in these areas, and will not need to calculate impacts annually.~~

D. Work Window

Sediment removal may occur during the work window of June 15 – October 15. Water quality monitoring shall be performed per the Water Quality Monitoring Plan and all excavated sediment shall be tested per the Sediment Characterization Plan. ~~Water quality monitoring shall be performed per the Sediment Monitoring Protocols at each sediment removal site.~~

1. Extended Work Window. ~~An extended work window may occur from October 15 – December 31. The work window extension allows for the continuation of work during dry time periods~~
   a. Creeks supporting anadromous fish:
      An extended work window may occur from October 16 through October 31, or until local rainfall of 0.5 inches or greater falls within the subject watershed within a 24-hour period, whichever occurs first.
   b. Creeks not supporting anadromous fish:
      An extended work window may occur from October 16 through November 30th, or until local rainfall of 0.5 inches or greater falls within the subject watershed within a 24-hour period, whichever occurs first.

2. Extended Work Window in Lower Quality Areas~~Requirements~~:
   a) Work may occur~~continue~~ from October 16 until December 31~~or until local rainfall of 0.5 inches or greater falls within the subject watershed within a 24-hour period, whichever transpires first~~.
   b) Work areas will be included in the annual NPW.
   c) Work will only~~may~~ occur ~~after a significant rainfall event of 0.5 inches within a 24-hour period, only~~ within Berryessa Creek (0-88+80; 232+70-236+00; 284+30-288+00), Lower Silver Creek (Reach 3 between Stations 37+40 and 381+19)), Thompson Creek (0+00-10+00), Canoas Creek (0+00-390+00), Ross Creek (0+00-86+30), Calabazas Creek (35+00-105+00), and San Tomas Aquino Creek (80+00-100+00), if:
      i. a preconstruction biological survey is performed and clearance provided,
      ii. site conditions are dry and access for all construction equipment and vehicles will not impact roadways,
      iii. water diversions will not be allowed,
      iv. all work will stop if any rainfall event is forecast three (3) days into the future, and an
      v. ~~email notification of work will be provided to the regulatory agencies two (2) days in advance of scheduled work.~~

   ~~c) S~~sites must be maintained in a winterized state. (See section 4. Bank Stabilization, I.~~glossary~~ for a definition of winterization.)
   d) Work may occur after a significant rainfall event but no later than December 31.

E. Applicable BMPs

Specific BMPs that are applicable to sediment removal activities are listed in Attachment F. These BMPs may be revised on an annual basis based on actual experience and site conditions.

F. Mitigation

Work that is conducted in areas not originally projected in 2002, will be ~~Mitigation for sediment removal is~~ calculated annually and determined per the requirements of the mitigation package described in the Mitigation Approach Memorandum, Appendix C, Final SEIR ~~and summarized in the Mitigation chapter of this Manual~~. ~~described in the 2012 SMP FEIR, and included in the Mitigation chapter of this Manual.~~ Work projected in the 2002 SMP has been mitigated for in perpetuity, will continue to have work performed in these areas, and will not need to calculate impacts annually.

G. Annual Notification and Reporting

See the Water Quality Monitoring Plan and Sediment Characterization Plan ~~Monitoring and Reporting chapter of this Manual~~ for a description of reports that must be submitted to regulatory agencies during implementation of the SMP.

H. Water Quality Monitoring Plan For Sediment Removal

Minimum field sampling must be done for any site with active diversions. See the Water Quality Monitoring Plan for information on: (1) additional monitoring efforts and regulatory agency notification in case of exceedance of Receiving Water Limitations; (2) monitoring procedure; (3) monitoring for bladder dam use; (4) monitoring for new turbidity control BMPs; and (5) details on type of records and field documentation to be kept by District staff.

I. Sediment Characterization Plan For Sediment Removal

Sediment characterization is required for each sediment removal site. See the Sediment Characterization Plan for more information on: (1) additional information selecting random sampling location and how to determine the number of samples at each site; (2) sampling and analytical procedures used; and (3) details on type of records and field documentation to be kept by District staff.

4. BANK STABILIZATION

A. Purpose

Bank stabilization involves an action by the District to repair creek banks, levees and beds that are eroding or are in need of erosion protection. The District may implement bank stabilization when the problem: (1) causes or could cause significant damage to SCVWD property and/or adjacent property; or (2) is a public safety concern. Additional benefits of stabilizing eroding stream banks include reducing instream sedimentation, and protecting water quality and other beneficial uses such as riparian habitat and recreation. Repairs may take several forms from installing "hard" structures (e.g., concrete, sack concrete) to "soft" structures (e.g., willow brush mattresses, log crib walls, pole-plantings) or a combination (hybrid) of hard and soft structures. Bank stabilization also includes preventative maintenance to reduce the chances of banks eroding in the future. Such bank stabilization can potentially balance sediment and improve water quality.

Creek bank erosion is a natural process and mostly occurs during, or following, major storm events. Erosion can occur due to hydraulic forces and geotechnical conditions, and can be accelerated by adjacent land uses. Bank erosion can lower the stream bank and thereby increase the flood risk to adjacent properties. Bank erosion can also lead to increased downstream deposition which may further reduce conveyance capacity and increase the flood risk. Bank erosion may also cause vegetation and soil loss, damage to private or public property, transportation (trails and access roads), recreation, and utilities. Erosional conditions can increase turbidity which can be injurious to fish and aquatic life.

Sites with eroding or destabilized banks are evaluated for their local on-site soil conditions, slope stability, channel position, and geomorphic processes. A District engineer determines the most appropriate treatment to stabilize the bank, with consideration of habitat, species use, and other site beneficial uses. (See flow chart at the end of this chapter.) Based on the streambank conditions, the District design engineer will develop a treatment approach that stabilizes the streambank while trying to minimize the use of hardscape. In order to minimize temporal impacts to aquatic species due to failures of softer repairs and resulting sedimentation, a hardscape repair may minimize repeat work in an area and provide a long-term enhanced creek reach.

B. Work Activities

Bank stabilization activities may include installing "soft structures" (e.g., willow brush mattresses, log crib walls, and pole plantings), "hard structures" (e.g., concrete, sacked concrete), or a combination (hybrid) of hard and soft structures (shown in Attachment A of the Program Manual). Hybrid bank stabilization refers to a combination approach whereby softscape bank stabilization approaches like live construction, contour wattling, brush mattresses, or surface erosion matting are combined with a limited amount of rock toe protection at the base of the bank stabilization site. Additional boulders at the toe of the bank treatment is only applied if necessary, if there are hydraulic shear forces affecting the bank site, or geologic slumping or mass wasting forces affecting the site (because of the site's position or slope) that require the additional presence of mass/rock at the base of the slope.

Based on the existing channel functions at erosion sites, a treatment approach is developed that seeks to stabilize the streambank while minimizing the use of hardscape, but ensures that required flood protection elements are not compromised. Bank stabilization activities will use bioengineering approaches when feasible and appropriate to stabilize eroding streambanks. Softer approaches typically involve removing existing undesirable soil and material from the failed bank, reconstructing the bank by placing and compacting back-fill soils, installing seeding or erosion control fabric, and planting of native riparian vegetation at the top-of-bank, on the slope, and at the toe-of-slope to provide additional bank stability. If the situation requires it (i.e., due to high channel velocities, channel constrictions, controlling structures, or other limitations), rock riprap may be installed at the base of the rebuilt bank to provide additional strength (e.g., resistance against high shear stresses caused by high channel velocities) and reduce the likelihood of future maintenance at the site. In some cases, site conditions my require rock riprap installed to a higher elevation than just the base area. For installation of hard structures, existing undesirable soil and material from the failed bank is removed and the bank is reconstructed by placement of back-fill soil and the hardscape material.

Equipment used for bank stabilization activities may include excavators, bulldozers, cranes, front-end loaders, dump trucks, water trucks, pumps,

generators, compactors, and hand operated thumpers. Staging typically occurs on adjacent access roads or lands, if available, or within the work area. Where possible, soil and riprap are staged in areas that have been previously disturbed (i.e., service road, turn-outs, etc).

When repairs are made, banks are recontoured to match the adjacent bank slope (i.e., returned to pre-failure configuration), to the extent possible per site. If a riparian zone is present adjacent to the bank failure site, care will be taken to disturb the least amount of vegetation, including mature trees.

The District has included 13 bank stabilization methods (and sub-methods). Please see the Bank Stabilization Methods Table at the end of this section for a listing of the methods, mitigation and agency review requirements. Attachment A provides additional detail including conceptual schematics for each method.

Channel Access and Staging

Access to maintenance sites will occur via existing, adjacent access roads where present. Most SCVWD-maintained channels have at least one existing access road running along the top-of-bank on one side of the channel. Some channels have an access road on either side of the channel; and others may have a lower maintenance road along the lower level banks. When the channel shape, bank height, or the presence of mature vegetation prevents the use of the top-of-bank access roads, equipment can move down the channel slope via existing access ramps, or forge a new temporary access route. Selective clearing of shrubs or trees may be necessary on the banks to provide equipment access to the channel bed.

Tree removals necessary for bank stabilization activities would occur in a consistent manner as described above in Section 2.1.4 Hand Removal, G. Requirements. This includes any required mitigation for the removal of trees that occurs in relation to bank stabilization projects.

In the event that work will be performed within the channel bottom, all work will be performed in dry conditions or within an area dewatered by a stream flow bypass system.

C. Work Projection

Bank stabilization work can be performed in any creek under District jurisdiction unless specifically excluded by this Program. Bank stabilization is not

a projected activity since it cannot be pre-determined where a site will need repairs. The District has made a commitment that no more than half of the annual bank stabilization projects (in all watersheds combined) will be of impervious hardscape.

The District performs an estimated average of one mile of bank stabilization work each year.

D. Work Window

Bank stabilization work is allowed during the work window of June 15 – October 15. If a work extension is granted~~is more than 50% complete on October 15~~, it may continue until the approved date stated below~~-~~or until the first ~~5-day~~72-hour forecast that includes significant rainfall. Significant rainfall is defined as local rainfall of 0.5 inches or greater that falls within a 24-hour period in the subject watershed. Winterization materials will be available and on-site when rain falls. Winterization will be completed by the actual rainfall event. ~~All work must be completed by December 31.~~

Extended Work Windows

1. In Creeks Supporting Anadromous Fish
   An extended work window may occur until October 31st for bank stabilization projects that will be 50% complete by October 15th.

2. In Creeks Not Supporting Anadromous Fish
   a. An extended work window may occur from October 16 until November 30th for projects that will be 50% complete by October 15th, or until significant rainfall.
   b. An extended work window may occur from October 16 until November 30th for new bank stabilization projects that will be completed in five (5) days or less, or until significant rainfall.

E. Requirements

Except for in-kind repairs, all hardscape method designs will be submitted to the agencies through the NPW. Hardscape designs in the 14 designated steelhead creeks will include a scientifically sound justification for the use of hardscape in steelhead creeks. Water quality monitoring shall be performed per

the Water Quality Monitoring Plan and all excavated sediment shall be tested per the Sediment Characterization Plan.

F. Applicable BMPs

Specific BMPs that are applicable to bank stabilization activities are listed in Attachment F. These BMPs may be revised on an annual basis through the external Lessons Learned process, based on actual experience and site conditions.

G. Mitigation

Mitigation for bank stabilization work is determined on a project, site specific, annual basis per the mitigation ratios provided for in the Bank Stabilization Methods Table and per the requirements ~~abilities~~ described in the Mitigation Approach Memorandum, Appendix C FSEIR ~~chapter of this Manual~~. A Mitigation Feasibility Assessment will be performed at each bank stabilization site to determine the mitigation potential and success criteria per work site. The Mitigation Feasibility Assessment (MFA) process will evaluate site specific conditions and potential ecological functions at the site to determine the most suitable mitigation approach. The MFA process is described further below in Section H and in Attachment B.

The watershed engineer will develop the bank stabilization design with input from biological and horticultural staff. Integrating the needs of the repair site while considering the potential impacts to vegetation during the design process, will enhance the success of the stabilization project. Removal of any tree for a bank stabilization project, including tree removals for the purposes of access and/or staging, will be mitigated as described in Section 2.1.4 Hand Removal, G. Requirements~~the Mitigation chapter~~. An exception for removal of trees >12” dbh may be permitted if necessary for the success of the bank repair and as approved through the NPW. Mitigation requirements will be determined via the Tree Scoring for Removal of Trees and Shrubs 6 - 12” dbh, April 2011 (Attachment C of this SMP Program Manual 2012-2022).

The Bank Stabilization Methods Table includes the standard revegetation mitigation required per method used. The MFA process will determine the appropriate success criteria for the required mitigation given the project site conditions. The addition of appropriate native vegetation to unvegetated

hardscape methods that meet all revegetation success criteria can be considered for on-site mitigation credit.

H. Mitigation Feasibility Assessment

A Mitigation Feasibility Assessment (MFA) will be performed prior to finalizing the bank stabilization design to determine the revegetation potential of each bank repair site. The MFA will assess what plant species can be supported by the site and what the resulting success criteria should be based on the chosen species palette and site conditions. Site conditions with low value habitat have lower success criteria for cover and survival since the site conditions are less desirable and more challenging. High value habitat conditions support revegetation plantings and can achieve higher success criteria. See Attachment B of this SMP Program Manual 2012-2022, Mitigation Feasibility Assessment Field Protocol, July 2011 for implementation.

1. Purpose

Beyond simply installing mitigation on-site, it is an objective of the program to ensure feasible and the longer term sustainability of successful mitigation. The District's mitigation for bank stabilization projects will appropriately reflect site capabilities using the MFA. Planting species appropriate to the site conditions will promote a more successful revegetation program, in addition to a more efficient use of staff and natural resources. If a site has poor conditions yet is still desirable to plant, lower success criteria will be established to account for the poor site specific conditions. This will enable some replanting prior to seeking off-site mitigation. If the MFA results in a highly constrained site, then off-site mitigation will be considered to ensure greater revegetation success.

2. Site Assessment

The feasibility of mitigation depends on the opportunities and constraints of each bank stabilization site. These opportunities and constraints should be identified as part of the project planning process, prior to finalizing the bank repair design and regulatory agency review. The success criteria for mitigation should be evaluated and adjusted based on these findings. <u>Mitigation credit may also be provided to include site enhancements, such as soil amendments, that would increase the site's MFA potential.</u>

3. MFA Categories

The MFA will result in a revegetation potential divided into three separate categories: high, medium and low. Each of these categories is based on the presence or absence of specific attributes (opportunities and constraints) assessed for the site. If the project site is limited and it is determined that off-site mitigation is preferred, off-site locations will be evaluated using the same MFA.

Mitigation planting for bank stabilization projects will depend on the MFA for determining the appropriate site design and will be included in the NPW ~~may require regulatory agency review and approval~~ prior to commencing work.

I. Winterization

Winterization is the process to prepare and maintain work sites with the appropriate BMP's to prevent erosion, sediment transport, and protect water quality during the rainy season. Every bank stabilization project is winterized upon completion. For projects that are not finished by October 15th, the District relies on weather forecasts to prepare for anticipated significant rainfall. After October 15th, seventy-two-hour look-ahead weather forecasts from the National Weather Service (or local vendor such as the Western Weather Group) are consulted to prepare for possible winterization measures. If a significant rainfall is forecast within the coming 72-hr forecast window, then maintenance work that may result in sediment runoff to the stream shall be stopped, to allow adequate time to complete erosion control measures. Winterization materials will be available and on-site if rain falls after October 15th.

Winterization is the process to maintain project sites with the appropriate BMPs to prevent erosion, sediment transport, and protect water quality. Winterization occurs upon completion of bank repairs or on incomplete projects after October 15 and prior to the forecast of significant rainfall, 0.5 inches or greater of rainfall within 24 hours in the subject watershed. Winterization shall be completed prior to the occurrence of such actual significant rainfall. Winterization materials will be available and on-site when rain falls after October 15.

Winterization includes erosion control practices, sediment control practices, and general site and materials management.

Basic ground rules for winterization:

1. Direct runoff away from disturbed areas.
2. Retain existing vegetation as much as possible.
3. Fit grading to the surrounding terrain.
4. Prepare temporary drainages and outlets.
5. Grade/excavate outside of rainy season.
6. Minimize length and steepness of slope.
7. Stabilize disturbed areas by mulching, vegetating (hydromulching, hydroseeding, hydraulic matrices, blankets, etc.).
8. Use every dissipating measure to keep runoff velocities low.
9. Trap sediment on site.
10. Inspect, log, and maintain control measures after each storm.

Proper use of erosion and sediment control BMPs requires training by experienced professionals. Certifications are available through the IECA (International Erosion Control Association).

J. Annual Notification and Reporting

Regulatory staff must review and indicate approval for bank stabilization designs that use hard materials. These methods are specified in the Bank Stabilization Methods Table at the end of this section. Regulatory agency staff have 30 days to respond to a proposed bank stabilization project requiring their approval. Written responses of “no comment” are requested. If no comments are received upon 30 days, the project proposals are presumed to be approved. Proposals for bank stabilization designs which require pre-review can be submitted at any time of year.

The submitted review plans for bank stabilization projects will consist of:

1) A plan view of the erosion site,
2) A cross-section of the erosion site,
3) Photographs of the site,
4) Repair method selected,
5) Brief description of why the method was selected,
6) Description of mitigation, if any, including the MFA results,
7) Identification of representative sites that will be monitored, and
8) Explanation for the use of hardscape in the 14 steelhead creeks, if applicable.

~~See the Monitoring and Reporting chapter for a description of due dates and reports that must be submitted to regulatory agencies during implementation of the SMP.~~

K. Monitoring of Completed Bank Stabilization Projects

The completed monitoring forms will be submitted with the May Notice~~fication~~of Proposed Work (NPW). Following submittal of the NPW no further evaluation for submittal is required under the Stream Maintenance Program CEQA and associated regulatory approvals.

Each year in the May NPW, the District will identify any bank stabilization monitoring sites. This monitoring will include a visual observation of evidence of erosion upstream and downstream of the site (i.e., 200 feet), condition of the bank stabilization repair, and condition of vegetation planting.

Table 1. Bank Stabilization Methods Table

I.D. No.	Method	Mitigation Ratio	Hard[2]-/Soft-scape	Requires Plan Review by Agencies
1	Earth Repair	1:1	Soft	No
1A	Earth Repair with Buried Rock	1:1	Soft	No
2	Live Construction	1:1	Soft	No
2A	Live Construction with Boulder Toe	1:1 if boulder toe is vegetated 1½:1 if boulder toe is not vegetated	Vegetated: hybrid Not vegetated: hard	No
2B	Live Construction with Log Toe	1:1	Soft	No
3	Contour Wattling	1:1	Soft	No

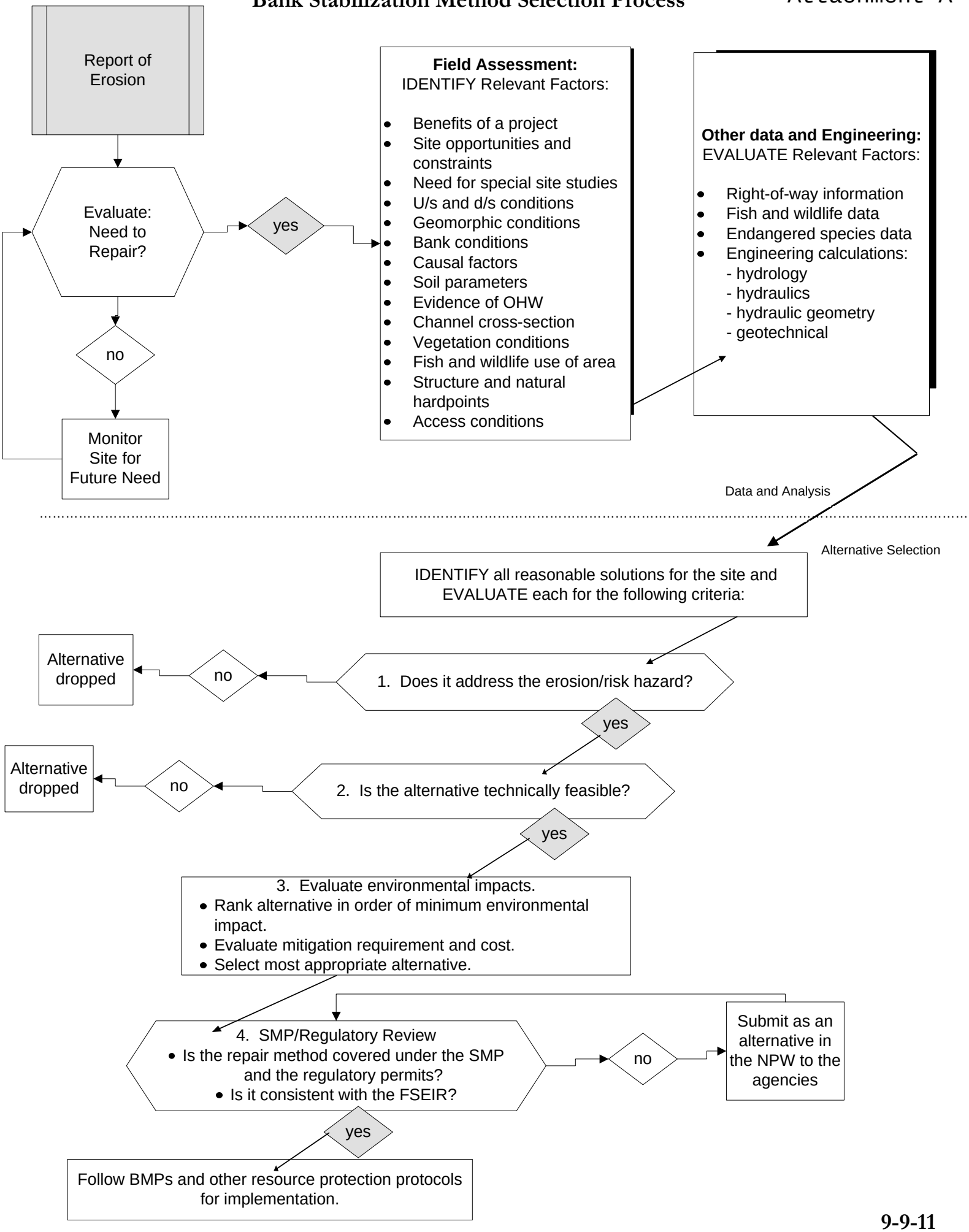
I.D. No.	Method	Mitigation Ratio	Hard[2]-/Soft-scape	Requires Plan Review by Agencies
3A	Contour Wattling with Boulder Toe	1:1 if boulder toe is vegetated 1½:1 if boulder toe is not vegetated	Soft	No
3B	Contour Wattling with Log Toe	1:1	Soft	No
4	Brush Mattress (Brush Layering)	1:1	Soft	No
4A	Brush Mattress (Brush Layering) with Boulder Toe	1:1 if boulder toe is vegetated 1½:1 if boulder toe is not vegetated	Vegetated: hybrid Not vegetated: hard	No
4B	Brush Mattress (Brush Layering) with Log Toe	1:1	Soft	No
5	Surface Matting (Erosion Mats)	1:1	Soft	No
5A	Surface Matting (Erosion Mats) with Boulder Toe	1:1 if boulder toe is vegetated 1½:1 if boulder toe is not vegetated	Vegetated: hybrid Not vegetated: hard	No
5B	Surface Matting (Erosion Mats) with Log Toe	1:1	Soft	No
6	Add Rock to Invert	1:1	hybrid	No
6A	Rock Cross Vanes	1:1	hybrid	No
6B	Root Wads and Boulders	1:1	hybrid	No
6C	Live Log Crib Walls	1:1	Soft	No

I.D. No.	Method	Mitigation Ratio	Hard[2]-/Soft-scape	Requires Plan Review by Agencies
6D	Log Revetment	1:1	hybrid	No
7	Cellular Confinement System	2:1	Hard	Yes
8	Rock Blanket	2:1	Hard	Yes
8A	Boulder Revetment	2:1	Hard	Yes
8B	Boulder Revetment with Soil and Vegetation	1:1	hybrid	Yes
9	Articulated Concrete Blocks	3:1	Hard	Yes
9A	Articulated Concrete Blocks with Planted Areas	2:1	Hard	Yes
10	Concrete Crib Walls	3:1	Hard	Yes
11	Sacked Concrete	3:1	Hard	Yes
12	Gunite Slope Protection	3:1	Hard	Yes
13[1]	Earth with Rock Toe on Grass Lined Channels	None if rock is below bankfull depth, and the mitigation ratio as specified in ID no. 1 thru 12 for areas above bankfull depth	Soft/hybrid	No

[1] Grass lined channels are those where grass is the predominant or sole vegetation, and that contain no significant riparian structure. The NPW submittal will include photographs and descriptions to justify use of this line item.

[2] All hardscape repair methods will be reviewed by the agencies.

Bank Stabilization Method Selection Process



5. MANAGEMENT of ANIMAL CONFLICTS

A. Purpose

Animals may damage District facilities by burrowing into levees, banks and along canals, forage on mitigation sites, and interfere with work activities. Animal burrows in levees and banks may threaten their structural integrity which can lead to failure, sloughing, and slumping. Animals feeding on vegetation can reduce the health and vigor of plants, or denude local areas. Animals can be territorial or defensive of specific resources or locations and can interfere with District facilities. The presence of some animals may require the District to postpone work activities. To avoid compromising District facilities and to reduce conflicts with species living in or protecting sites where work is needed, the management of animal conflicts may be undertaken.

B. Work Activities

Managing animal conflicts may include avoidance, biological control, physical alterations, habitat alteration, and lethal control. Work activities will be used during the appropriate season, life cycle timing and location to synergistically manage species at individual sites. Properly sequencing activities will more effectively manage the area by addressing different life stages and activities of the target animals.

1. Maintain Sanitary Conditions

   Wildlife biologists will work with the Department of Fish and Game and local agencies and Non-Governmental Organizations (NGOs) to identify and reduce potential wildlife disease outbreaks. Where appropriate, maintenance staff will remove and dispose of animal carcasses which do not pose a hazard to human health to reduce the spread of animal diseases. This may include the removal of animals that succumb to diseases such as botulism or avian cholera. The Santa Clara County Vector Control District will be contacted when animal carcasses are found that could pose a hazard to human health.

2. Avoidance

   Wildlife biologists conducting pre-construction surveys may recommend avoidance measures to protect individual species, specific resources (nests), or to reduce conflicts with potentially dangerous species such as mountain lions, bobcats, coyotes, raccoons, skunks, fox, or rattlesnakes. Where sensitive resources are present within the work site the biologist may establish appropriate buffers. For example, birds may occasionally become defensive and attack individuals or vehicles near nest sites or food resources.

If the ecological resource cannot be physically avoided, the biologist may recommend a temporal avoidance by delaying the work activity.

3. Maintain a safe work site environment.

   Field conditions and the types of animals encountered vary seasonally, geographically and per work activity. Swarms of wasps and bees can be located in a tree, arachnids and insects may be uncovered around culverts and bridges. Where avoidance and other measures are not sufficient to maintain a safe work site environment, off-the-shelf chemicals and sprays may be used.

4. Biological Control

   Biological control involves the deliberate release of one species into the environment to control a second species. Insects have been used as biological control agents to control other insect pests or to control plant species. Biological control may also include changing plant species composition to make a site inhospitable to a particular species.

   The District may change plant palettes to reduce the habitat suitability of a site for specific animals. Raptor nest structures and perches may be installed in areas to encourage natural predation on ground squirrels and gophers.

   Repellents may be used to deter rodents or other nuisance species, such as rabbits. Repellents may include plant species and extracts and will be used to target specific species. The placement of peppermint oil or capsaicin, or sprinkling pepper, cinnamon and cayenne in the areas where rodent activities are frequent, are examples of biological repellants.

5. Physical Alteration of the Facility

   Physical Alteration of a facility may include minor alterations that do not change the size or capacity of a facility to function but do promote the District's ability to conduct work at the facility. Bird netting on bridges or structures such as stream gauges and culverts may be installed to prevent birds such as swallows or black phoebes from nesting.

   Physical alterations may also occur to reduce or eliminate the effects of burrowing animals. Physical alterations of a facility may include:

   a. Surface compaction of levee faces with heavy construction equipment

Surface compaction consists of using heavy equipment to firm up, re-compact or harden the outer levee surface. Compaction is achieved by driving heavy equipment up and down or across the levee slope after the slope has been optimized for this operation. Optimization can include adding moisture (watering) to allow for better compaction rates, mowing the vegetation to improve equipment to soil contact, and possibly slurry filling identified rodent holes. Heavy equipment used to compact levee surfaces include the use of crawler tractors, rollers/compactors, and a water truck. Prior to the start of this method, the levee surface will be evaluated to determine how much moisture should be added. The levee surface is moistened using a water truck until an optimum moisture content is achieved. Heavy equipment then drives along the surface, traversing up and down the levee, compacting the soil to create a uniform surface.

b. Filling burrows with slurry material under pressure to backfill rodent holes

Filling burrows with slurry consists of using a truck or trailer mounted mixing machine to dispense a viscous, soil-like material (slurry) through a hose to adjacent locations where rodent burrow are filled. This operation requires good mobility and cannot be excessively large in order to accommodate the movement from site to site. In order to be mobile and flexible, the mixing equipment is relatively small, able to mix less than a few cubic yards at any given moment. A typical operation includes a truck or flatbed where bags of slurry mixture can be stored and transported, a trailer mounted mixing/pumping machine, and a water truck. At rodent burrow filling locations, bags of dry slurry material are hand loaded into the mixing machine and water is added until the appropriate consistency is reached. The material is then pumped through a hose to the actual rodent burrow where the slurry is pumped into the burrow until filled. Viscosity of the slurry mixture is critical in properly filling the burrows, and will vary dependent upon the moisture of the soil at the hole location. If the burrow is within the buffer area of a sensitive species, the hole must be inspected with a burrow camera, systematic excavations may be necessary to ensure no impact to sensitive species. Excavations may be performed with a small backhoe or hand tools.

c. Reconstruction of levee side slopes

Reconstructing levee slopes requires an operation to excavate or demolish a larger area of levee damaged by rodent burrows and rebuild it to the standard it was originally constructed. This type of operation would

utilize heavy equipment like an excavator, crawler tractor, loader, dump truck, motor grader, roller/compactor, scraper, back hoe, and a water truck.

d. Placing physical barriers, such as geotextile mats, chain link, exclusion fence, and erosion control blankets.

Placement of physical barriers consists of preparing an area for installation of the barrier, installing the barrier and providing follow up maintenance as needed. Site preparation may include scraping the barren soil, removing groundcover vegetation (weeds or grasses), or trenching. Equipment used for this operation can include hand tools, tractor, mower or trencher. This work activity is currently performed as a function of bank stabilization projects to prevent erosion and protect water quality. It is also used to winterize recently constructed maintenance projects.

6. Habitat Modification

Modifying the habitat through vegetation management is another method that is used to influence animal behavior. Low growing, herbaceous vegetation may be cleared prior to nesting bird season to minimize nesting in the area. Likewise, mowing or discing vacant or fallow lands adjacent to flood control levees can decrease the future food source and habitat for burrowing rodents. By limiting available forage areas adjacent to key District facilities, burrowing rodent populations may be reduced.

Habitat modification may include:

a. Managing vegetation growth to prevent individuals from taking up residence, burrowing or nesting.
b. Maintaining vegetative barriers to reduce animal occupancy at a site.
c. Change a plant pallet to reduce habitat suitability or desirability.

7. Non-lethal Trapping - Relocation

The District may employ non-lethal trapping and removal of animals when they occur in project areas. Animals to be removed and released out of harm's way include but are not limited to reptiles and amphibians. Honey bee colonies and swarms may be captured by local apiarists at the District's request.

The trapping and removal of birds will only be conducted in consultation and under separate permit from the U.S. Fish and Wildlife Service and authorization from the Department of Fish and Game.

The trapping and movement of mammals will only be conducted in consultation and under separate authorization from the Department of Fish and Game and/or U.S. Fish and Wildlife Service.

8. Lethal Control

a. Management

Control methods will be prescribed by a Pest Control Advisor. Compliance with species and habitat protections under the Program is managed by a biologist knowledgeable with the affected species. Lethal control methods will comply with County Agriculture Commission requirements. Non-native species in the work area will not receive special protections, though considerations will be made to minimize their harm.

b. Methodology

1. Fumigants

To be effective, fumigants are used when there is sufficient moisture in the soil to prevent the gases from diffusing out of the burrow. In Santa Clara County, this normally occurs between late January through early May. In areas where there are active burrows, an initial fumigant treatment will be conducted. One to two (1-2) weeks later, burrows that continue to show signs of activity will be retreated. California ground squirrels and gophers are the most targeted species.

a) Gas Cartridges (smoke bombs): Gas cartridges consist of a mixture of sodium nitrate, charcoal, and sawdust compressed in a tube. Cartridges are lit with a fuse and placed directly into the burrow which is then sealed with soil. The cartridge produces a carbon monoxide gas that spreads through the burrow and asphyxiates the animals within. If smoke is observed from any other burrows, those burrows are sealed as well.

b) Aluminum phosphide: Aluminum phosphide is a colorless gas with a punget odor (UC BMP's for California Ground Squirrel Control,

2011). Two to four aluminum phosphide tablets are placed directly into the burrow. The burrow entrance is then plugged with crumbled newspaper to seal the entrance and prevent soil from covering the tablets. The moisture in the burrow activates the fumigant which produces a phosphine gas that spreads through the burrow and is lethal to the enclosed animals.

2. Chemical Bait Types
   a) Acute toxins
      i. Zinc phosphide (Zn_3P_2): Formulations used in rodent control consist of a heavy, finely ground, crystalline gray-black powder that is practically insoluble in water and alcohol. It is available in pellet or grain baits that have been treated and dyed black (the black dye reduces the risk to birds). Zinc phosphide will be used one time per season once the ground and annual vegetation has dried out and burrowing rodent feeding habits transition from forbes to grains and seeds (normally between May and July). When ingested, zinc phosphide reacts with moisture and stomach acids to produce a lethal phosphine gas, causing death by asphyxiation. Treatment areas will be pre-baited with untreated non-toxic bait to enhance bait acceptance.

         Zinc phosphide will be applied by spot baiting (hand baiting). Using a bait spoon, 1 tablespoon of bait is spread evenly over the grass area near each active ground squirrel burrow. Each area will be limited to one treatment of zinc phosphide per year.

         To reduce the potential for exposure to non-target species the bait will not be piled and not be applied to bare soil or other surfaces. Zinc phosphide is used prior to application of the anticoagulant baits in order to significantly reduce the number of squirrels. This results in a lower population needing to be targeted with bait stations as well as reducing the number of squirrel carcasses that contain anticoagulant residue that could cause secondary poisoning of non-target species. (Salmon UC BMP's for California Ground Squirrel Control, 2010)

ii. Strychnine: Strychnine treated bait is the most common rodenticide used for gopher control. Gopher control may occur year round depending on activity level. Strychnine is only used underground and only for gopher control. A probe is used to locate main runways and strychnine treated bait is deposited into the runway where gophers are most likely to find it. The probe hole is then covered. Gopher runways typically occur at a depth of six to eight inches (CDFA Vertebrate Pest Control Handbook, 2010).

b) First generation ~~A~~anticoagulants (e.g. chlorophacinone and diphacinone): First generation ~~A~~anticoagulant baits are chronic baits that require several feedings over a period of days to a week to acquire a lethal dose. The anticoagulants cause capillaries to rupture and prevent the formation of blood clots which causes the animal to bleed to death over the period of a few days. Anticoagulant treated baits are used when burrows are active and can be strategically timed for use following a zinc phosphide application. The anticoagulants are applied in bait stations from May to November. The herbaceous vegetation should be dried out so ground squirrels are not feeding on green vegetation during application, but have transitioned from feeding on forbes to grains and seeds.

Bait stations have a 3-inch diameter opening to restrict access from non-target species and a lip to prevent feeding animals from spilling bait outside of the bait stations. The bait stations are secured in place to prevent them from being tipped over. Bait stations can also be removed or damaged by the public who may oppose their use. The application areas are surveyed during active baiting on a weekly basis and carcasses are removed to minimize secondary poisoning (UC BMP's for California Ground Squirrel Control, 2011).

3. Trapping

a) Live traps: Live trapping is typically used when other methods are not appropriate due to concerns with special-status species. Live

trapping takes place year round when ground squirrels are present above ground. Wire cage traps are baited with untreated bait. The wire traps have openings no smaller than 2 inches by 1 inch, which is large enough to allow mice and other small species to escape the trap. Live traps are checked daily. Ground squirrels are removed from the site and are humanely euthanized with carbon dioxide gas. Non-target species will be released on-site as soon as they are detected.

b) Kill traps: Box traps and tunnel/tube traps are placed in main ground squirrel runways. Body gripping traps are placed over the entrance of a burrow. Traps are checked daily.

9. Coordinate with local, State, or Federal agencies.

The District may contract or request assistance from local, state, or federal agencies to capture nuisance animals such as feral cats, dogs, red fox, opossum, or skunks. The District may contract with local, state, or federal agencies to control animals on sites where the District manages the habitat for threatened and endangered species.

10. Safety

Label use restrictions will be followed for all rodenticides used. Fumigants will not be used near dry grasses or other flammable material. Fumigants will not be used near buildings.

Zinc phosphide persists for approximately two weeks under average conditions (U.S. National Library of Medicine, 1995). Zinc phosphide breaks down when exposed to water and converts to phosphine gas which is then diluted by air. In areas accessible to the public the District will provide postings that the area has been treated, which will be kept in place for two weeks following the initial application of zinc phosphide. <u>After two weeks the bait will be deactivated with water, converting zinc phosphide into zinc phosphine gas.</u> All postings will include a staff contact for further information.

Bait stations will be secured in place and will have a lip inside the opening to prevent any bait from being spilled by a feeding rodent. Any spilled bait will be cleaned up immediately and properly disposed of.

C. Work Projections

Management of Animal Conflicts is not a projected work activity as these activities may occur anywhere along the District's creeks and canals.

D. Work Window

Management of animal conflicts may occur year round. The method of control used will be based on the seasonal efficacy of the animal's life cycles and in compliance with the protection of special-status species.

E. Requirements

1. A District Wildlife Biologist will conduct a desk audit to determine whether suitable special-status species habitat is present in or adjacent to a maintenance activity.

2. If the District Wildlife Biologist determines that a special-status species could occur in the activity area avoidance and minimization measures will be inserted into the work order requirements including but not limited to:
   a) Salt Marsh Harvest Mouse Habitat
      i. No rodenticides or fumigants will be used within the range of the salt marsh harvest mouse (as identified by District range map or other information available to the wildlife biologist).
      ii. Methods of rodent control within SMHM or CCR habitat will be limited to live trapping. All live traps shall have openings measuring no smaller than 2 inches by 1 inch to allow any SMHM that inadvertently enter the trap to easily escape. All traps will be placed outside of pickleweed areas and above the high tide line..
   b) Burrowing Owls, Bald Eagles and Golden Eagles
      i. A 656-yard buffer will be established around known burrowing owl locations where no rodenticides or fumigants (including smoke bombs) will be used.
      ii. A 0.5-mile buffer will be established around known bald eagle and golden eagle nesting locations where no rodenticides will be used.
   c) Special Status Amphibians
      i. Fumigants will not be used within the potential range of sensitive amphibians (California Red-legged Ffrog, California Tiger Salamander

and Foothill Yellow-legged Frog) as identified by District mapped range maps.

ii. Within the potential range of the California red-legged frog, California Tiger Salamander or Foothill Yellow-legged frog (as identified by District range maps or other information available to the wildlife biologist) will be limited to bait stations specifically designed to prevent entry by these species.

3. Carcass surveys will be conducted periodically when acute poisons and first generation anticoagulants are used. The frequency of the carcass surveys will be specific to the type of rodenticide used.

   a) Acute Toxins – ~~Daily c~~Carcass surveys will be performed daily beginning the first day after application above ground until the end of the baiting period.
   b) Anticoagulants – ~~Weekly cC~~arcass surveys will begin within seven days after first-generation anticoagulants are made available. Anytime a carcass is found daily carcass surveys will begin for as long as carcasses are found until no carcasses are found during a daily survey. Once no carcasses are found, carcass surveys will return to the weekly carcass survey timeline maximum from the date of initial installation of an anticoagulant bait station.

4. To verify that the frequency of carcass surveys is adequate, a biologist will conduct daily carcass surveys 2 times per year over one baiting cycle. Based on the results of these surveys, the timing of carcass surveys will be adjusted if necessary.

5. Any spilled bait will be cleaned up immediately and disposed of properly.

1. Applicable BMPs

Specific BMPs that are applicable to management of animal conflicts are listed in Attachment F. These BMPs may be revised on an annual basis through the external Lessons Learned process, based on actual experience and site conditions.

References

CDFA Vertebrate Pest Control Handbook http://vpcrac.org/about/handbook.php. Accessed 4/19/2010.

Michigan Department of Natural Resources and Environment, Zinc Phosphide¸ http://www.michigan.gov/dnr/0,1607,7-153-10370_12150_12220-26326--,00.html, January 2011.

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University of California Best Management Practices for California Ground Squirrel Control http://groups.ucanr.org/GSBMP/index.cfm Accessed 1/25/11.

U.S. National Library of Medicine. Hazardous Substances Databank. Bethesda, MD, 1995.

6. MINOR MAINTENANCE ACTIVITIES

A. Purpose

Minor Maintenance activities are performed to make repairs and maintain District facility functions. Maintenance activities may occur along creeks, canals and at stream gauges. These small scale activities may occur throughout the SMP program area, but they do not change the footprint of any existing facility. These are minor activities because they are small in size and their potential environmental impact to resources is limited.

Please refer to the Canal Maintenance chapter for additional detail regarding maintenance work in District canals.

B. Work Activities

Maintenance activities are considered minor if they result in the removal of less than 0.05 acres (2178 sq ft) of wetland or riparian vegetation. The minimum reporting size for any vegetation work is 0.01 acres (436 sq ft) per project. Any vegetation work necessary for project access or staging is included in this calculation of potential project impacts.

Minor Maintenance activities include:

1. cleaning and minor sediment removal at outfalls, culverts, flap gates, tide gates, inlets, grade control structures, fish ladders, fish screens. Work at these facilities is limited to 50 cubic yards. Vegetation removal will be calculated and tracked to ensure compliance with annual maximums. All other work must be projected.

2. minor sediment removal less than 10 cubic yards per site may be removed anywhere at SMP stream/canal facilities;

3. trash and debris removal;

4. repair and installation of fences and gates;

5. grading and other repairs to restore the original contour of existing maintenance roads;

6. grading small areas above streambanks (without vegetation) to improve drainage and reduce erosion;

7. repair structures with similar materials within approximately the same footprint (such as replacement of concrete linings, culverts, pipes, valves or similar structures; or repairing a weir, in-stream orifice, communication pipe). For purposes of this activity description, similar materials means that materials will be replaced in-kind, such that hardscape and softscape facilities will be replaced with similar materials, respectively (as defined in the Bank Stabilization Methods Table.

8. graffiti removal;

9. installation and on-going maintenance of mitigation and landscape sites, including: irrigation, weed control, replanting of dead or declining individual plants and other types of ongoing maintenance at mitigation sites; until such time when the success criteria are met or the site fulfills the establishment phase requirements;

10. removal of obstructions at structures: bridges (not to exceed 100 feet upstream and downstream of the bridges), streamflow measuring stations (stream gauges), box culverts, storm drain outfalls and drop structures to maintain functions of such structures. See the Vegetation Management section for vegetation removal requirements.

11. Stream gauge maintenance including stilling well cleaning, painting of gauge house, replacing/adding antenna or solar panels to existing structures, replacing instrumentation, cableway repair, weir cleaning of algae and debris, and unburying staff markers/orifice/communication pipes.

C. Work Projections

Minor Maintenance is not a projected work activity and may occur throughout the SMP program area. Minor Maintenance activities are not

expected to have significant negative impact to water quality or beneficial uses when best management practices are implemented.

D. Work Window

Minor Maintenance activities may be performed year round or within the Work Window for specified Work Activities. Minor sediment or vegetation work must comply with the Work Windows specific to those work activities, even when they are Minor Maintenance activities.

E. Requirements

A minor activity is defined to be minor work that results in the removal of less than 0.05 acres (2178 sq ft) of wetland or riparian vegetation. The minimum reporting size is 0.01 acres (436 sq ft) per project. In addition, all minor activities for a single year have a total wetland or riparian vegetation impact of 0.2 acre and a total of 2 acres for the 10-year program. Any impact to wetland or riparian vegetation necessary for access or staging must be calculated as part of this total.

F. Mitigation

Work in Minor Maintenance is limited to those activities that do not have potentially significant impacts to resources, and thus do not require mitigation.

G. Applicable BMPs

BMPs that are applicable to the specific work activities are listed in Attachment F~~A~~. These BMPs may be revised on an annual basis through the external Lessons Learned process, based on actual experience and site conditions.

H. Annual Notification and Reporting

~~Regulatory agency staff will receive information regarding potential Minor Maintenance projects that require their review and approval for minor activities that have an impact exceeding 0.05 acre per activity per site.~~ Notification and reporting will be provided for minor activities that have an impact of less than 0.05 acre/site~~will be similar to those for sediment removal projects~~. When reporting minor work projects which are outside of the major work areas, a map will be provided showing the location of both.

No reporting or mitigation will be required if a minor work activity results in removal of less than 0.01 acre of wetland and riparian vegetation.

H. CANAL MAINTENANCE

A. Purpose

The SMP includes routine and periodic maintenance of its canal facilities. The location of District canals are shown in the DSEIR Project Description (pgs 22-23) Figure 2-39, and representative photos are provided in Figure 2-40. The primary function of District canals are to serve as water supply transport facilities, though they also provide incidental flood protection by capturing surface runoff. During the first nine (9) years of the SMP, 2002-2010, the average length of a sediment job in canals was ~~1643~~ 1635 feet; removing an average of ~~661~~ 290 cubic yards of sediment annually.[~~1~~]

Future resource conservation programs, such as the Santa Clara Valley Habitat Plan or the Three Creeks Habitat Conservation Plan, may also provide regulatory coverage for maintenance activities at canals. If in the future another program provides adequate regulatory oversight for canal maintenance activities, then the SMP may be revised to exclude canal maintenance activities. Any such changes or revisions to the program would be coordinated with the SMP's regulatory agency partners.

Canal maintenance activities include the work activities previously discussed in this Program Manual, including: sediment removal, vegetation management, management of animal conflicts, and minor maintenance activities. Any and all of these activities may also occur at canals for all of the same reasons stated in the individual sections above, namely to provide flow conveyance and to maintain the function of the canal systems. Any damage to canal banks would be repaired with in-kind materials, as covered under the Minor Maintenance activity. Work activity parameters previously described herein, would also apply when performed in and along canals. For example, removal of trees ≤ 6 inches in diameter may be removed from canals without additional mitigation debts incurred. Similarly, tree removal activities at canals are implemented consistently with the protocols described in the Vegetation Management Chapter 2 and mitigation requirements as described in the Mitigation Approach Memorandum, Appendix C FSEIR ~~chapter~~.

B. Work Projections

1. Sediment Removal

Sediment removal may occur anywhere along the canals; though no more than 1000 cubic yards will be removed per calendar year, for all watersheds combined.

2. Vegetation Management

Vegetation Management may occur anywhere along the canals. The activities of herbicide application, mowing, hand removal of trees and shrubs, and pruning may occur within and adjacent to the canals. Of the 41 total miles of canals, no more than 6 acres of work will be performed during the period 2012-2022.

Discing may only be performed on Coyote Alamitos canal on the right bank from GIS stationing 188+88 – 208+88.

3. Minor Maintenance

Minor maintenance is not a projected work activity and may occur anywhere along the canals.

4. Management of Animal Damage

Management of Animal Damage is not a projected work activity and may occur anywhere along the canals.

C. Work Activities

1. Sediment Removal

Sediment removal activities range from 2 - 50 cubic yards in a single area and are performed to clear sediment deposits ("plugs") where local sediments have either entered the canal or have been deposited. Canal sediment removal will generally occur using a small loader from the top of the adjacent canal access road. Canal sediment removal may be conducted using hand tools at sites with small sediment volume. Sediment removal will be less than 1000 cubic yards per calendar year for all canals.

For further description of sediment work, please refer to the Sediment Removal chapter of this manual~~document~~.

2. Vegetation Management

The following work activities are permitted within canals:

a) Hand removal
b) Herbicide
c) Pruning

The following work activities are permitted outside of and along canals:

a) Herbicide (Pre- and post-emergent herbicide applications will be made to maintain clear access roadways.)
b) Mowing
c) Pruning

For further description of vegetation management work, please refer to the Vegetation Management chapter of this manual~~document~~.

3. Minor Maintenance

Minor Maintenance activities for canals include:

a) trash and debris removal;
b) repair and installation of fences and gates;
c) grading and other repairs to restore the original contour of existing maintenance roads;
d) grading small areas without vegetation above canal banks to improve drainage and reduce erosion;
e) repair of structures with similar materials within approximately the same footprint (such as replacement of concrete linings, culverts, pipes, valves or similar structures; repairing a weir, in-stream orifice, or communication pipe). For purposes of this section, similar materials means replacing hardscape and softscape materials with like materials, as defined by the Bank Stabilization Methods Table.
f) graffiti removal;
g) installation and on-going maintenance of mitigation and landscape sites, including: irrigation, weed control, replanting of dead or declining individual plants and other types of ongoing maintenance at mitigation sites; until such time when the success criteria are met or the site fulfills the establishment phase requirements; and
h) removal of obstructions at structures: bridges (not to exceed 100 feet up canal and down canal of the bridges), stream flow measuring stations, box culverts, storm drain outfalls and drop structures to maintain functions of such structures. See the Vegetation section for vegetation removal requirements.

For further description of minor maintenance activities, please refer to the Minor Maintenance chapter of this document.

4. Management of Animal Conflicts

Management of Animal Conflicts methods include:

a) Maintain Sanitary Conditions,
b) Avoidance,
c) Biological Control,
d) Physical Alteration of the Facility,
e) Habitat Modification,
f) Non-lethal Trapping – Relocation,
g) Lethal Control, and
h) Coordinate with Local, State or Federal agencies.

For further description of management of animal conflicts methods and protocols, please refer to the Management of Animal Conflicts chapter of this document.

D. Work Window

1. Sediment Removal

Sediment removal in canals may occur year round. Sediment removed during the wet season may be placed on the top-of-bank area adjacent to the canal (side casted) until the area is dry and heavy vehicles can easily access the area without damaging the roadways and facilities. Water quality monitoring shall be performed per the Sediment Characterization Plan protocols at each sediment removal site.

2. Vegetation Management

Vegetation management activities may occur:

a) In-canal (wetted area) hand pruning and hand removal may occur year round, except:
    i. Where ~~large~~ mechanized equipment would need to access the site by crossing a creek or otherwise affect water quality, or
b) In-canal (wetted area) herbicide application may occur between June 15 - October 15.
    i. In-canal herbicide work may continue until December 31 or until local rainfall greater than 0.5 inches falls within the

subject watershed within a 24-hour period, whichever transpires first.

c) Non-instream (bank/bench)~~Upland~~ herbicide work may occur year round, weather permitting and per product label.

d) Vegetation management outside the bankfull channel may occur year round, weather permitting.

i. Year round work opportunities do not apply to areas where equipment would need to access the site by crossing a creek or otherwise affect water quality.

3. Minor Maintenance

Minor maintenance activities may be performed year-round.

4. Management of Animal Conflicts

Management of animal conflicts may occur year round. The method of control used will be based on the seasonal efficacy of the animal's life cycles and in compliance with the protection of special-status species.

E. Requirements

For Management of Animal Conflicts activities, the following exclusions apply:

1. A District Wildlife Biologist will conduct a desk audit to determine whether suitable special-status species habitat is present in or adjacent to a maintenance activity.

2. If the District Wildlife Biologist determines that a special-status species could occur in the activity area avoidance and minimization measures will be inserted into the work order requirements including but not limited to:

a) Salt Marsh Harvest Mouse Habitat

i. No rodenticides or fumigants will be used within the range of the salt marsh harvest mouse (as identified by District range map or other information available to the wildlife biologist).

ii. Methods of rodent control will be limited to live trapping with the traps having openings measuring no smaller than 2 inches by 1 inch to allow the smaller Salt Marsh Harvest Mouse to escape.

b) Burrowing Owls, Bald Eagles and Golden Eagles

i. A 656-yard buffer will be established around known burrowing owl locations where no rodenticides or fumigants (including smoke bombs) will be used.
ii. A 0.5-mile buffer will be established around known bald eagle and golden eagle nesting locations where no rodenticides will be used.

c) Special Status Amphibians
i. Fumigants will not be used within the potential range of sensitive amphibians (California red-legged frog, California Tiger Salamander and Foothill Yellow-legged Frog) as identified by District mapped range maps.
ii. Within the potential range of the California red-legged frog, California Tiger Salamander or Foothill Yellow-legged frog (as identified by District range maps or other information available to the wildlife biologist) will be limited to bait stations specifically designed to prevent entry by these species.

3. Carcass surveys will be conducted periodically when acute poisons and first generation anticoagulants are used. The frequency of the carcass surveys will be specific to the type of rodenticide used.

a. Acute Toxins – ~~Daily c~~Carcass surveys will be performed daily beginning the first day after application above ground until the end of the baiting period.
b. Anticoagulants – ~~Weekly c~~Carcass surveys will begin within seven days after first-generation anticoagulants are made available. Anytime a carcass is found daily carcass surveys will begin for as long as carcasses are found until no carcasses are found during a daily survey. Once no carcasses are found, carcass surveys will return to the weekly carcass survey timeline maximum from the date of initial installation of an anticoagulant bait station.

~~3. Carcass surveys will be conducted periodically when acute poisons and anticoagulants are used. The frequency of the carcass surveys will be specific to the type of rodenticide used.~~
~~a) Acute Toxins – Daily carcass surveys~~

~~b) Anticoagulants – Weekly carcass surveys.~~

4. To verify that the frequency of carcass surveys is adequate, a biologist will conduct daily carcass surveys 2 times per year over one baiting cycle. Based on the results of these surveys, the timing of carcass surveys will be adjusted if necessary.

5. Any spilled bait will be cleaned up immediately and disposed of properly.

F. Applicable BMPs

Applicable BMPs will vary depending upon the specific work activity that is taking place. All BMPs are listed in Attachment F. These BMPs may be revised on an annual basis based on actual experience and site conditions.

ATTACHMENT A

Bank Stabilization Methods

Bank Stabilization Measures

#1: Earth Repair

Description:

Earth repair involves the replacement and repair of eroded channel banks using compacted soil. The eroded slope is scarified and readied for fill placement. A three-foot deep key is cut into the invert. Fill is placed and compacted 80% to 90% in 8-inch lifts. The new slope is trimmed to a 2:1 slope. The surface is seeded with fast sprouting grass species like rye. Geotextile/erosion control fabric is placed over hydroseeding to secure newly compacted bank.

The fill material needs to be appropriate to this purpose. There should be no deleterious or organic material or other debris contained in the fill. The Atterberg Plasticity Index of the material should be between 15 and 25, with the Liquid Limit no higher than 40. The material must contain at least 20% clay (by weight) passing U.S. standard sieve number 200.

Design Criteria:

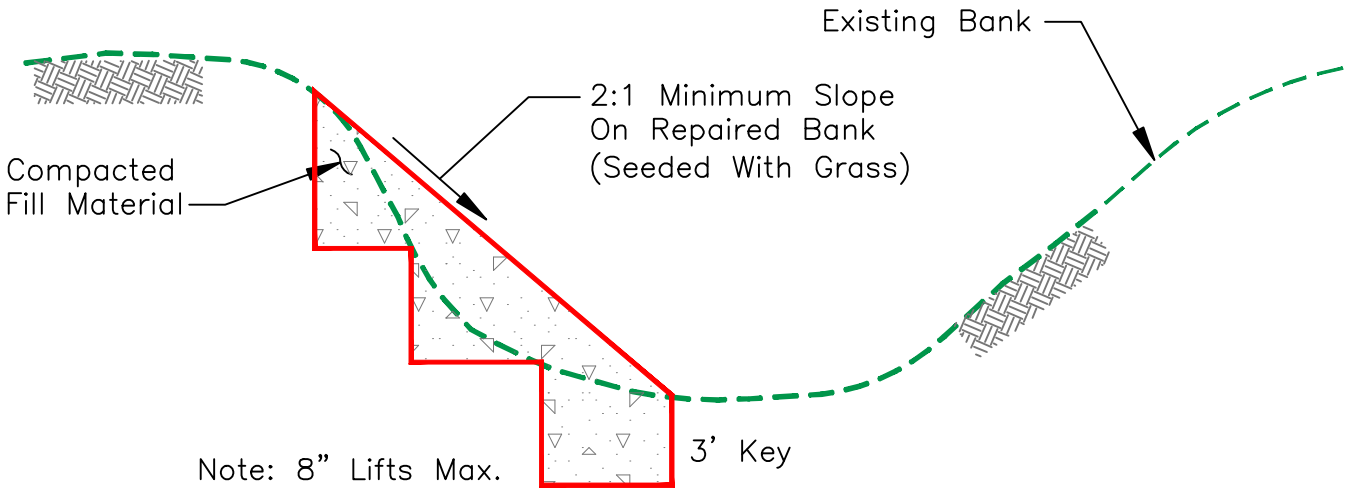
Appropriate on bank slopes of 2:1 or flatter.

Appropriate for local stream velocities of 6 feet per second or less.

Habitat Impact Assessment:

In-stream:	Provides limited biotic resources
Stream-side:	Provides limited biotic resources

Bank Stabilization Measures
#1: Earth Repair



SECTION

#1A: Earth Repair with Buried Rock

Description:

Earth repair with buried rock protects against erosion scour and stabilizes excavated or steep channel embankments. The buried rock (rock buttress) contributes to slope stability and prevents embankment failure (e.g., slumps, slides, sags). The rock structure will guard against bank scour, loss of adjacent property, protect infrastructure, and arrest future erosion, thereby reducing the loss of riparian vegetation during high flow events. The rock buttress is buried and compacted earth is placed over the top to provide an area for plants and stream side restoration.

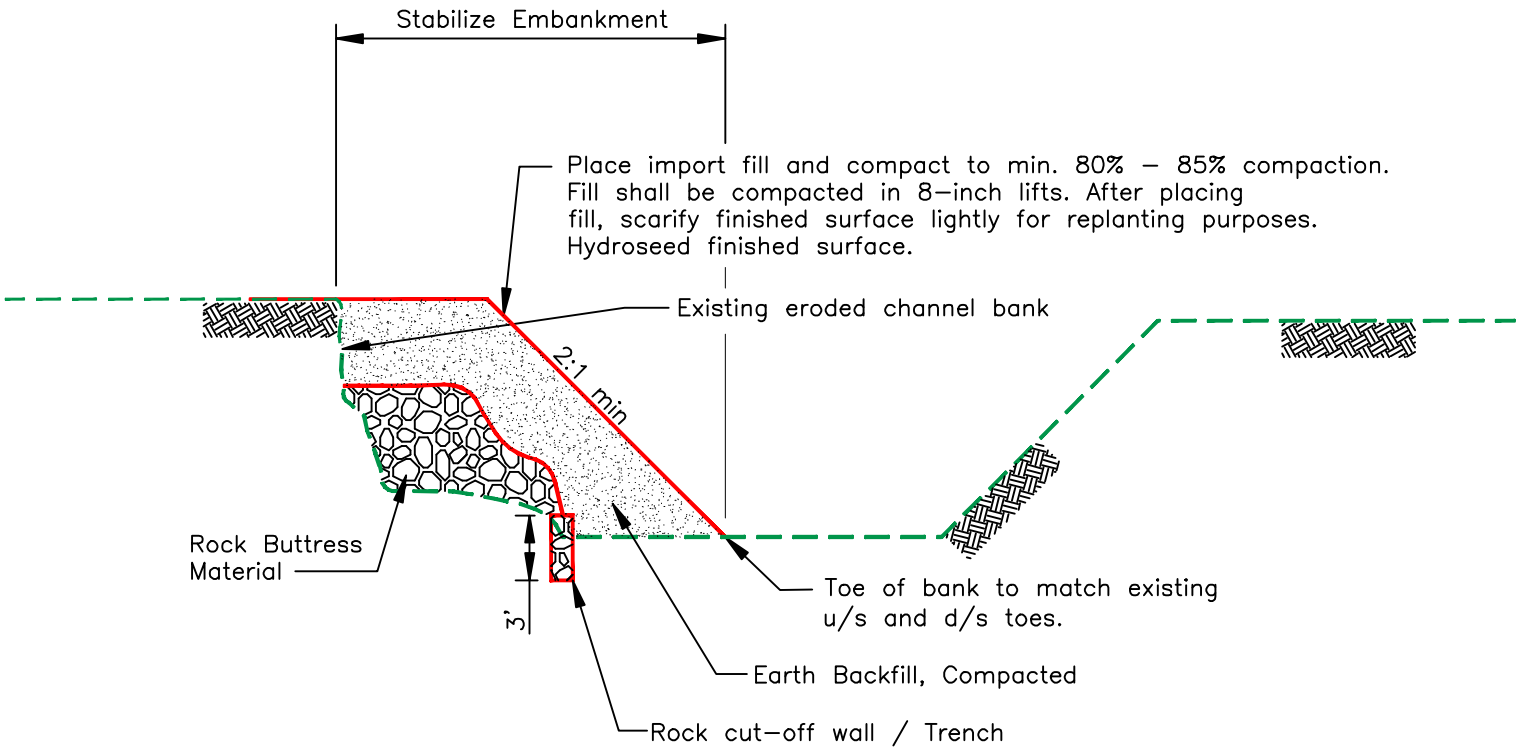
Since the rock is permanently buried, mitigation is not required. Any understory or trees planted within the footprint of the embankment repair will be counted as a credit for the SMP program. Depending upon the local creek ecology, hydrology, and channel capacity, plants utilized in the restoration area may consist of a mix of ground cover, understory, and/or trees.

The buried rock typically requires a cutoff wall to prevent undermining. The cutoff wall is an excavated trench with revetment, rock, or boulders placed inside. The rock buttress is composed of rock revetment or boulders placed and stacked in such a manner as to construct a gravity retaining wall. The buttress height is limited and may be installed on cut benches in the embankment for purposes of stability. Earth is placed in successive lifts adjacent to the toe of the rock buttress and over the tops of the boulders. Once the earth has been placed, the overbuilt embankment is cut and trimmed back to match the upstream and downstream channel side slopes and toes.

Habitat Impact Assessment:

In-stream:	Enhances biotic resources
Stream-side:	Enhances biotic resources

Bank Stabilization Measures
#1A: Earth Repair with Buried Rock



Bank Stabilization Measures

#2: Live Construction

Description:

Live construction consists of traditional methods of grading stable slopes and planting live grasses and other plants to control erosion. Vegetation planting methods commonly used include cuttings, transplants, live staking, and direct seeding (including hydro-seeding). Plants are chosen on the basis of drought tolerance and erosion control effectiveness. Biodegradable erosion control materials could be used where necessary in conjunction with live construction to assist in plant establishment.

Excellent revegetation potential. Most successful in streambanks where moderate erosion and channel migration are anticipated. Bank slope, eroding velocity, and reinforcement at the toe of the bank are limiting factors. Enhances conditions for colonization of native species. Streambank soil materials, probable groundwater fluctuation, and bank loading conditions are factors for determining appropriate design.

Design Criteria:

Appropriate on bank slopes of 2:1 or flatter.

Appropriate for local stream velocities of 6 feet per second or less.

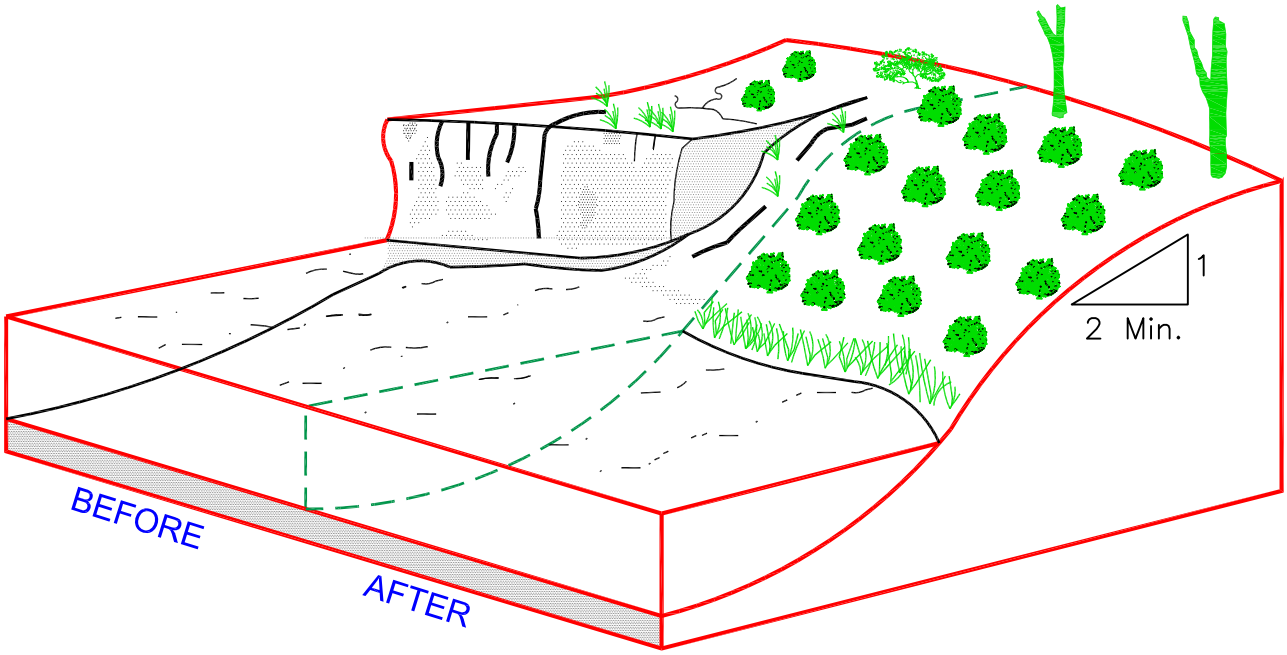
Soil moisture conditions and availability of water year-around determines appropriate vegetation species.

Habitat Impact Assessment:

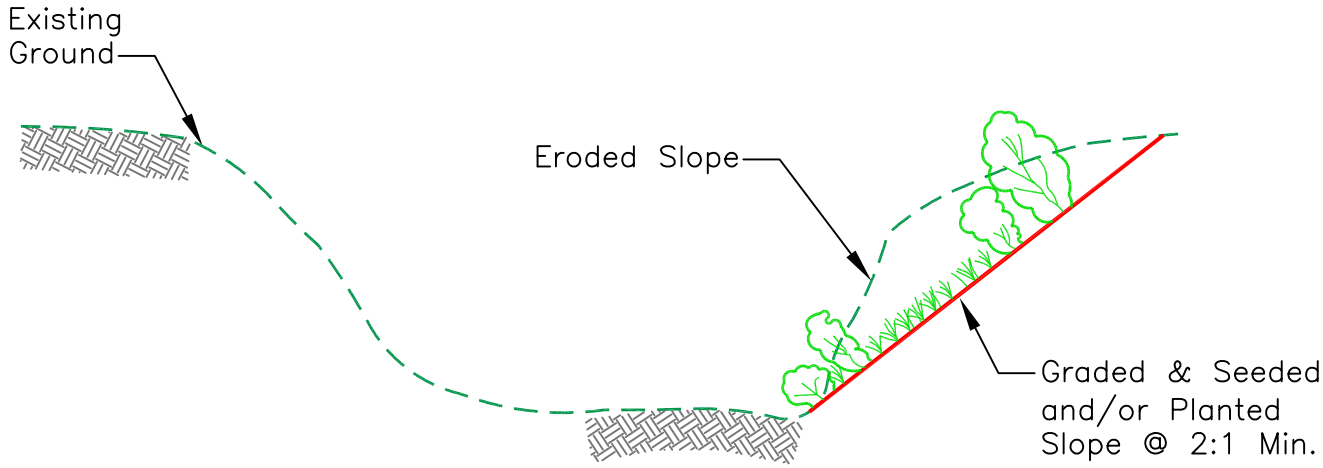
In-stream: Enhances biotic resources
Stream-side: Enhances biotic resources

Source: Adapted from Natural Resources Conservation Service. Stream Corridor Restoration Principles, Processes and Practices

Bank Stabilization Measures
#2: Live Construction



Source: Adapted from Natural Resources Conservation Service, Stream Corridor Restoration Principles, Processes and Practices



SECTION

#2A: Live Construction with Boulder Toe

Description:

Live construction consists of traditional methods of grading a flatter slope and planting live grasses and other plants to control erosion. Vegetation planting methods commonly used include cuttings, transplants, live staking, and direct seeding (including hydro-seeding). Plants are chosen on the basis of drought tolerance and erosion control effectiveness. Biodegradable erosion control materials are used where necessary in conjunction with live construction to assist in plant establishment.

Appropriately-sized boulders are placed at the toe of the rebuilt bank up to the ordinary high water elevation. Voids in between the boulders can be planted using live stakes.

Excellent revegetation potential. Enhances conditions for colonization of native species. Streambank soil materials, probable groundwater fluctuation, and bank loading conditions are factors for determining appropriate design.

Design Criteria:

Appropriate on bank slopes of 2:1 or flatter for live construction section. 1.5:1 or flatter for boulder section.

Boulders must be keyed in (minimum 3 feet deep) at the toe of bank.

Appropriate for local stream velocities of 6 feet per second or less.

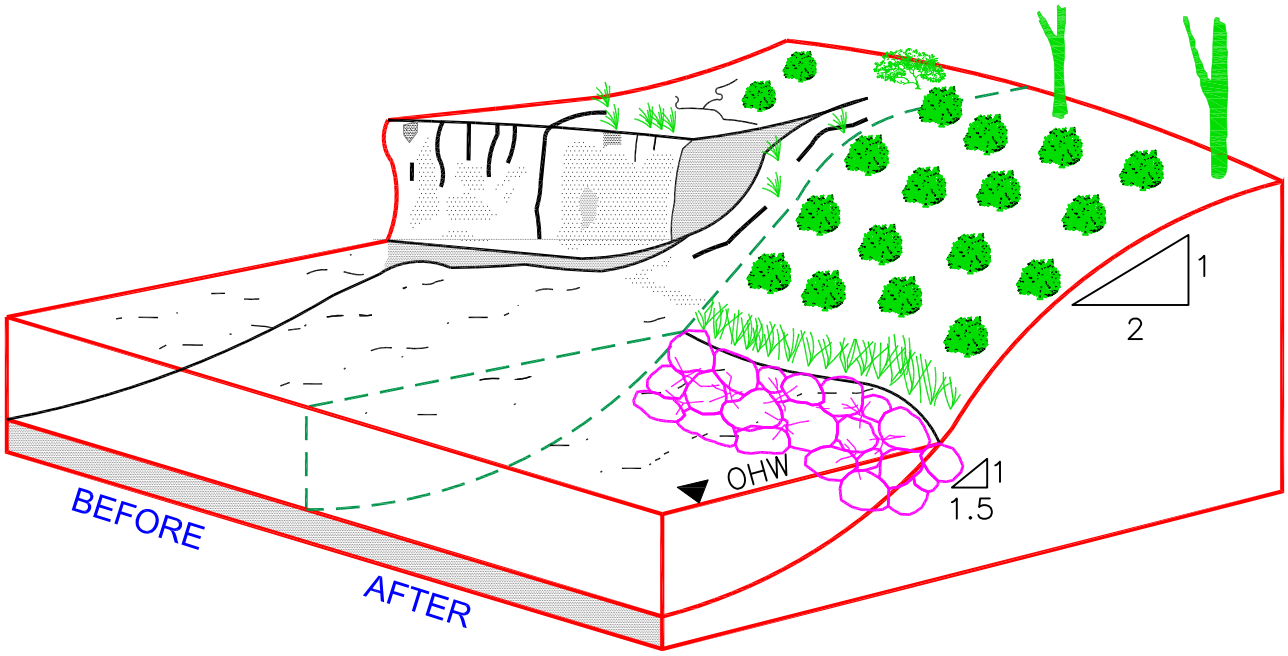
Soil moisture conditions and availability of water year-around determines appropriate vegetation species.

Habitat Impact Assessment:

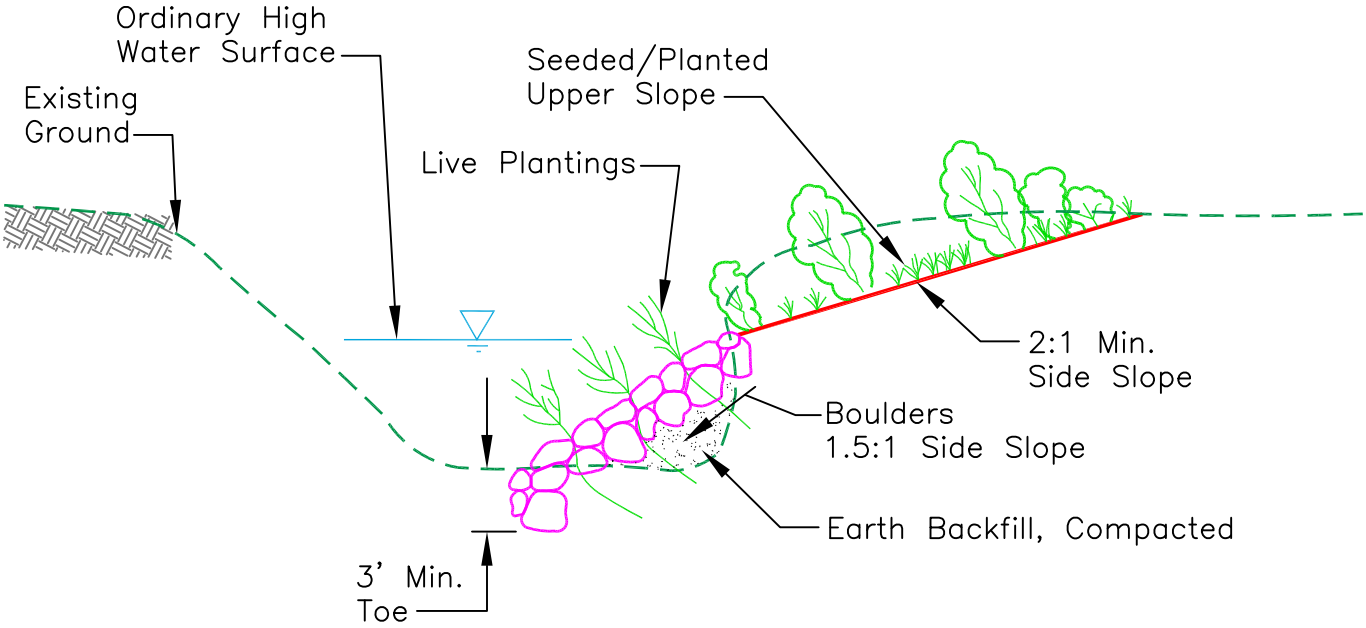
In-stream: Enhances biotic resources
Stream-side: Enhances biotic resources

Source: Adapted from Natural Resources Conservation Service. Stream Corridor Restoration Principles, Processes and Practices

Bank Stabilization Measures
#2A: Live Construction with Boulder Toe



Source: Adapted from Natural Resources Conservation Service, Stream Corridor Restoration Principles, Processes and Practices



SECTION

#2B: Live Construction with Log Toe

Description:

Live construction consists of traditional methods of grading a flatter slope and planting live grasses and other plants to control erosion. Vegetation planting methods commonly used include cuttings, transplants, live staking, and direct seeding (including hydro-seeding). Plants are chosen on the basis of ecological suitability and erosion control effectiveness. Biodegradable erosion control materials are used where necessary in conjunction with live construction to assist in plant establishment[1].

Logs are anchored to the bed and/or native bank up to ordinary high water elevation. Determine scour depth, log size (typically between 6 inches to 24 inches in diameter), and anchor system based on specific site conditions. Where applicable and/or available, rootwads may also be used.

This repair method is used to protect the toe line from erosion. It is especially useful for long straight channel reaches. The logs provide immediate protection from erosion while live branch cuttings contribute long-term durability and ultimately replace the decaying logs[2].

Design Criteria:

Appropriate on bank slopes of 2:1 or flatter for live construction section. 1.5:1 or flatter for log toe section.

Install log toe with anchors. Moisture conditions and availability of water year-round determines appropriate vegetation species.

Appropriate for local stream velocities of 15 feet per second or less.

Habitat Impact Assessment:

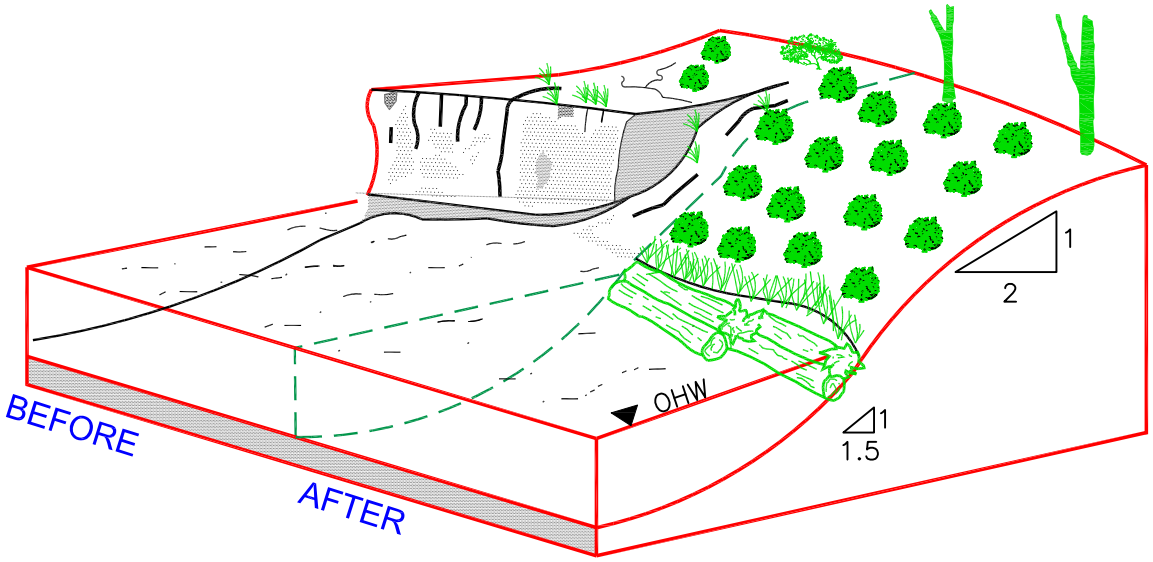
In-stream: Enhances biotic resources
Stream-side: Enhances biotic resources

[1]Source: Adapted from Natural Resources Conservation Service. Stream Corridor Restoration Principles, Processes and Practices

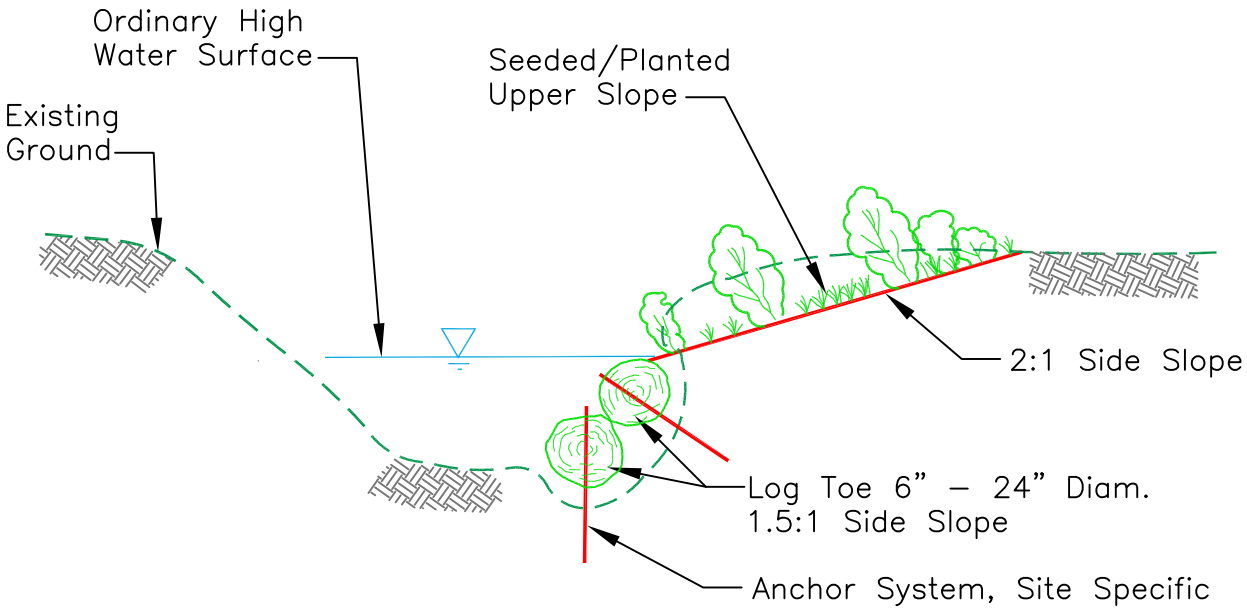
[2]Source: Santa Clara Valley Water District, “Design Manual Open Channel Hydraulics and Sediment Transport”. July 2009

Bank Stabilization Measures

#2B: Live Construction with Log Toe



Source: Adapted from Natural Resources Conservation Service, Stream Corridor Restoration Principles, Processes and Practices



SECTION

Source: Adapted from Santa Clara Valley Water District; "Design Manual Open Channel Hydraulics and Sediment Transport", July 2009

Bank Stabilization Measures

#3: Contour Wattling

Description:

This method consists of tying long bundles of plant stems (typically willows or cottonwoods) together with twine and anchoring them in shallow trenches with wooden stakes. When the stems develop root systems and mature, the plants establish structural soil stabilization properties. This technique is generally used to manage surface erosion.

Excellent revegetation potential. The long bundles trap and hold soil on banks by creating small, dam-like structures, effectively cutting the slope length into a series of shorter slope lengths. This method enhances the conditions for colonization of native species and should, where appropriate, be used with other soil bioengineering systems and live plantings. Reinforcement at the toe or bank may be a limiting factor (see bank stabilization measures 3A and 3B). Not appropriate for treatment of slopes actively undergoing mass earth movement[1].

Design Criteria:

Appropriate on bank slopes of 2:1 or flatter.

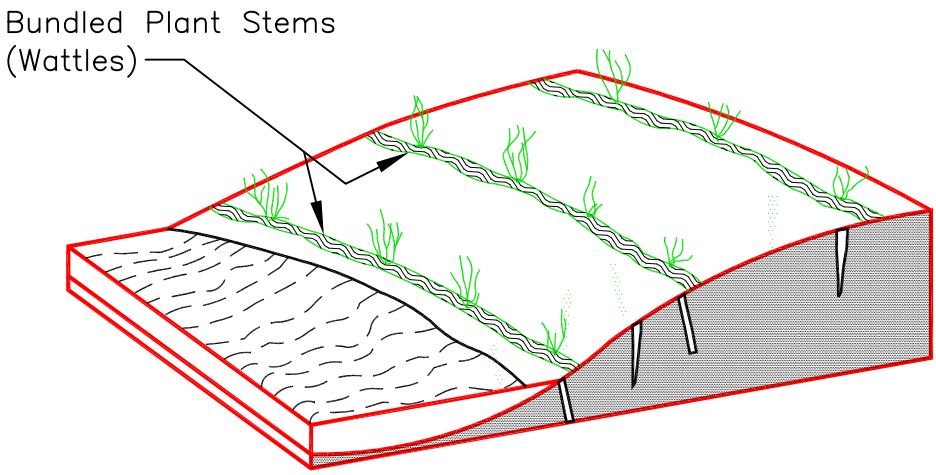
Appropriate for local stream velocities of 6 feet per second or less.

Habitat Impact Assessment:

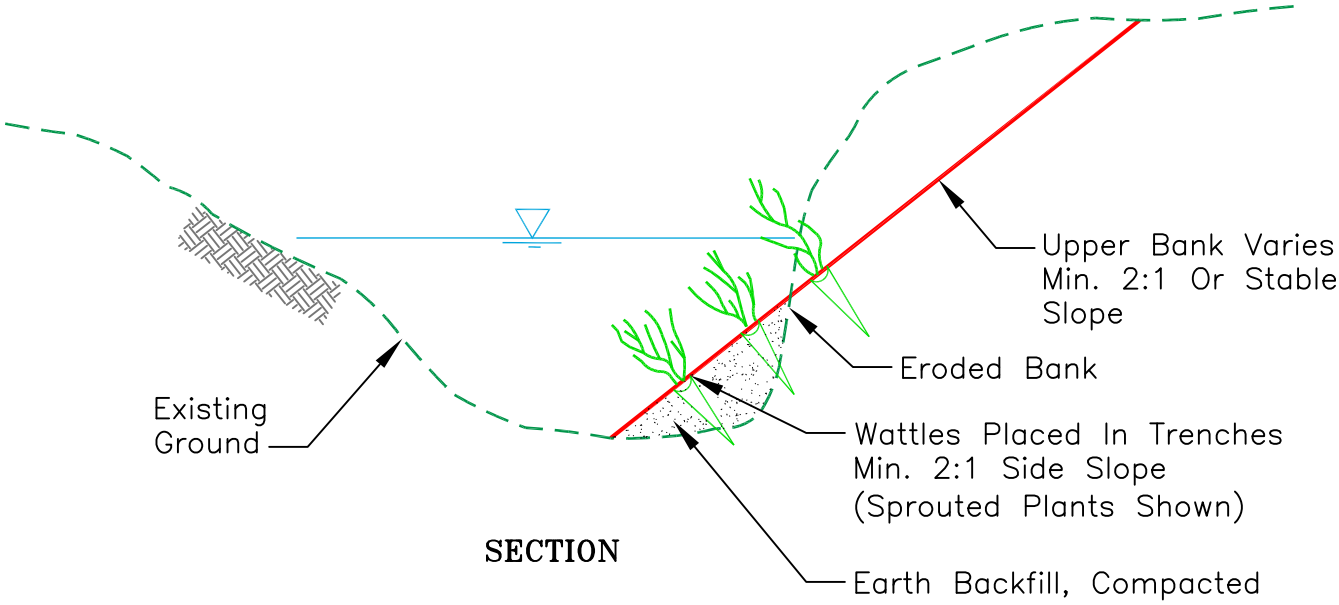
In-stream: Enhances biotic resources
Stream-side: Enhances biotic resources

[1]Source: Natural Resources Conservation Service. Stream Corridor Restoration Principles, Processes and Practices

Bank Stabilization Measures
#3: Contour Wattling



Source: Natural Resources Conservation Service, Stream Corridor Restoration Principles, Processes and Practices



#3A: Contour Wattling with Boulder Toe

Description:

This method consists of tying long bundles of plant stems together with twine and anchoring them in shallow trenches with wooden stakes. When the stems develop root-systems and mature, the plants establish structural soil stabilization properties.

Appropriately-sized boulders are placed at the toe of the rebuilt bank up to the ordinary high water elevation. Voids in between the boulders can be planted using live stakes.

Excellent revegetation potential. The long bundles trap and hold soil on banks by creating small, dam-like structures, effectively cutting the slope length into a series of shorter slope lengths. This method enhances the conditions for colonization by native species and should, where appropriate, be used with other soil bioengineering systems and live plantings. Not appropriate for treatment of slopes actively undergoing mass earth movement[1].

Design Criteria:

Appropriate on bank slopes of 2:1 or flatter for contour wattling section of slope, and slopes of 1:5 or flatter for boulder section.

Boulders must be keyed in (minimum 3-foot depth) at toe of bank.

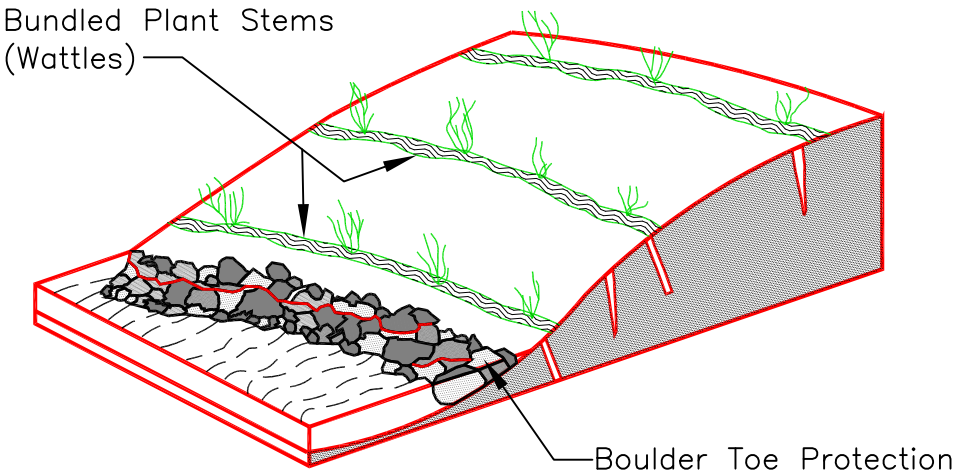
Appropriate for local stream velocities of 6 feet per second or less.

Habitat Impact Assessment:

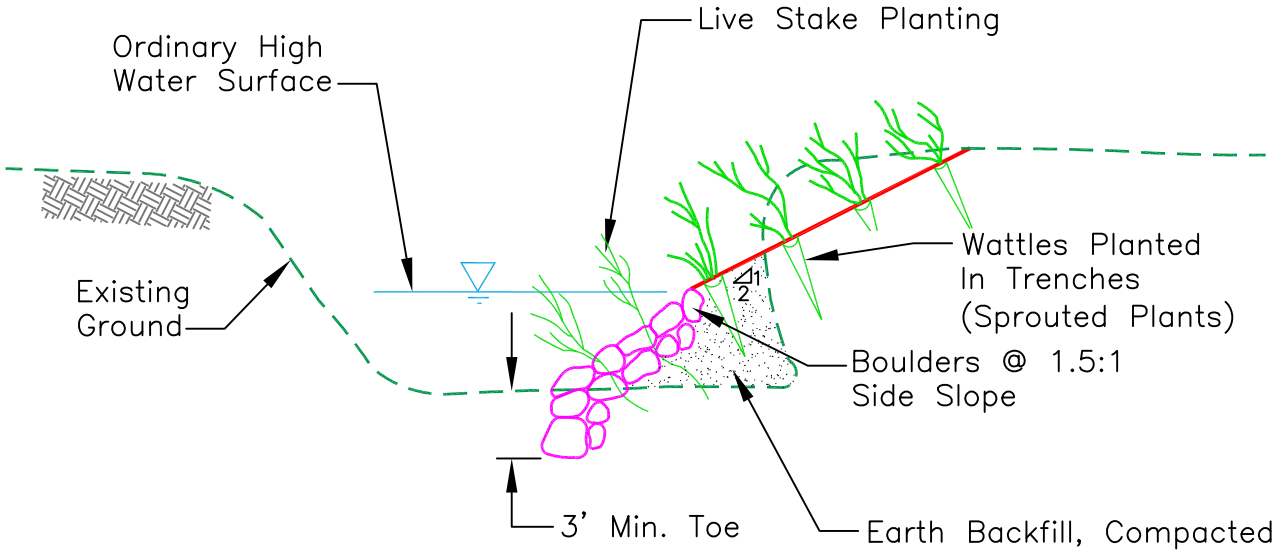
In-stream: Enhances biotic resources
Stream-side: Enhances biotic resources

[1]Source: Natural Resources Conservation Service. Stream Corridor Restoration Principles, Processes and Practices

Bank Stabilization Measures
#3A: Contour Wattling with Boulder Toe



Source: Adapted from Natural Resources Conservation Service, Stream Corridor Restoration Principles, Processes and Practices



SECTION

#3B: Contour Wattling with Log Toe

Description:

Contour wattling consists of tying bundles of plant stems together with twine and anchoring them in shallow trenches with wooden stakes. When the stems develop root systems and mature, the plants establish structural soil stabilization properties.

Logs are anchored to the bed and/or native bank up to ordinary high water elevation. Determine scour depth, log size (typically between 6 inches to 24 inches in diameter), and anchor system based on specific site conditions. Where applicable and/or available, rootwads may also be used.

This repair method is used to protect the toe line from erosion as well as manage surface erosion. It is especially useful for long straight channel reaches. The logs provide immediate protection from erosion while contour wattlings contribute to long-term durability and ultimately replace the decaying logs.

Excellent revegetation potential. The long bundles trap and hold soil on banks by creating small, dam-like structures, effectively cutting the slope length into a series of shorter slope lengths. This method enhances the conditions for colonization by native species and should, where appropriate, be used with other soil bioengineering systems and live plantings. Not appropriate for treatment of slopes actively undergoing mass earth movement[1].

Design Criteria:

Appropriate on bank slopes of 2:1 or flatter for contour wattling section of slope, and slopes of 1.5:1 or flatter for log toe section.

Install log toe with anchors. Moisture conditions and availability of water year-round determines appropriate vegetation species.

Appropriate for local stream velocities of 15 feet per second or less.

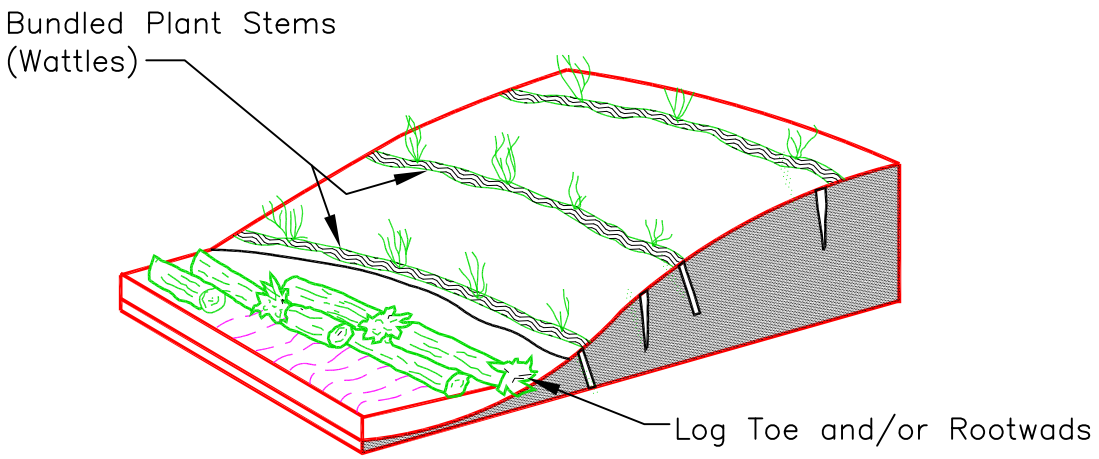
Habitat Impact Assessment:

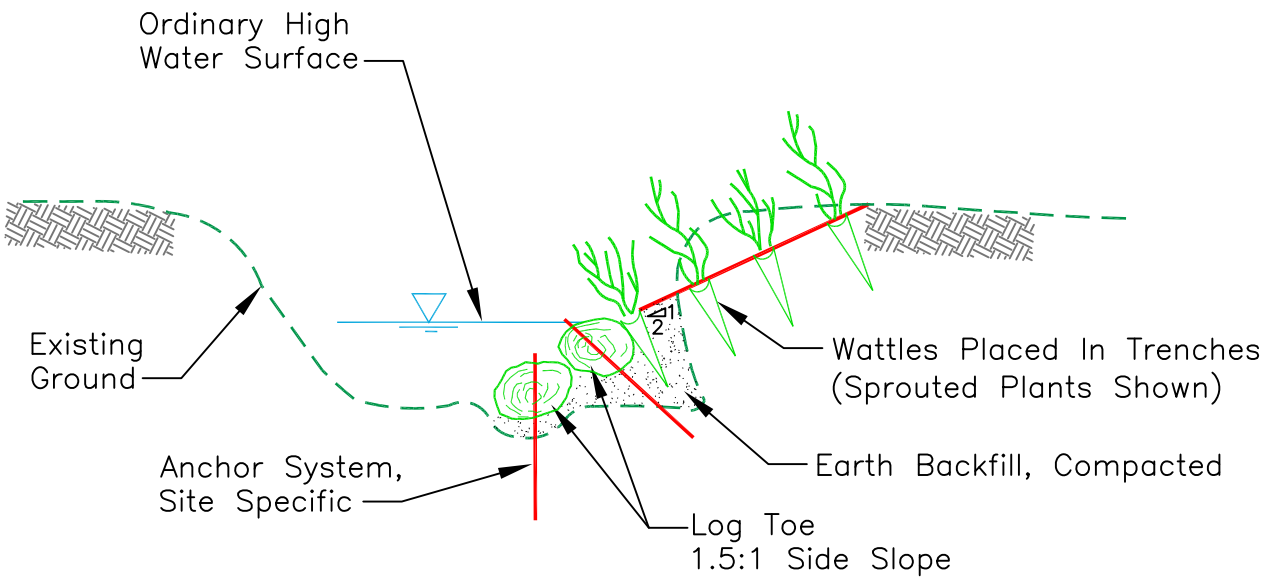
In-stream: Enhances biotic resources
Stream-side: Enhances biotic resources

[1]Source: Adapted from Natural Resources Conservation Service. Stream Corridor Restoration Principles, Processes and Practices

Bank Stabilization Measures

#3B: Contour Wattling with Log Toe





SECTION

Source: Adapted from Natural Resources Conservation Service, Stream Corridor Restoration Principles, Processes and Practices

Bank Stabilization Measures

#4: Brush Mattress (Brush Layering)

Description:

The eroded slope is graded and smoothed to ensure all willows are in contact with soil. A minimum 2-foot deep trench is dug at the toe of the bank for the butt ends of the willow branches. Wood, steel, or live willow stakes are partially driven in rows on three-foot centers in the area that will be covered by the mattress. After the stakes have been placed, live willow branches are put on the bank with their butt ends in the trench. Straight branches no shorter than 4 feet in length and ½-inch to 1-inchin diameter are used. If the branches are not long enough to reach the upper end of the mattress, several layers may be used; however, it is necessary to "shingle" the layers by lapping each new layer over the one below by at least 18 inches. Once the bank is covered by a thick layer of willows, cross branches are placed horizontally over the bottom layer. These branches are placed against the stakes and then tied to the stakes using wire or string. The stakes are then driven into the bank a minimum of two feet or deeper, if possible. After the completion of the mattress, the toe trench is filled with appropriately sized boulders and rocks to anchor the butt ends of the branches. The entire mattress is then covered by earth or fine stream material[1].

This method forms an immediate protective cover over the stream bank, captures sediment during flood flows, and rapidly restores riparian vegetation and streamside habitat. This measure is not appropriate where toe scour is anticipated (see bank stabilization methods 4A and 4B). This method should not be used on slopes that are experiencing ongoing mass movement or other slope instability[2].

Design Criteria

Appropriate on bank slopes of 2:1 or flatter.

Appropriate for local stream velocities of 6 feet per second or less.

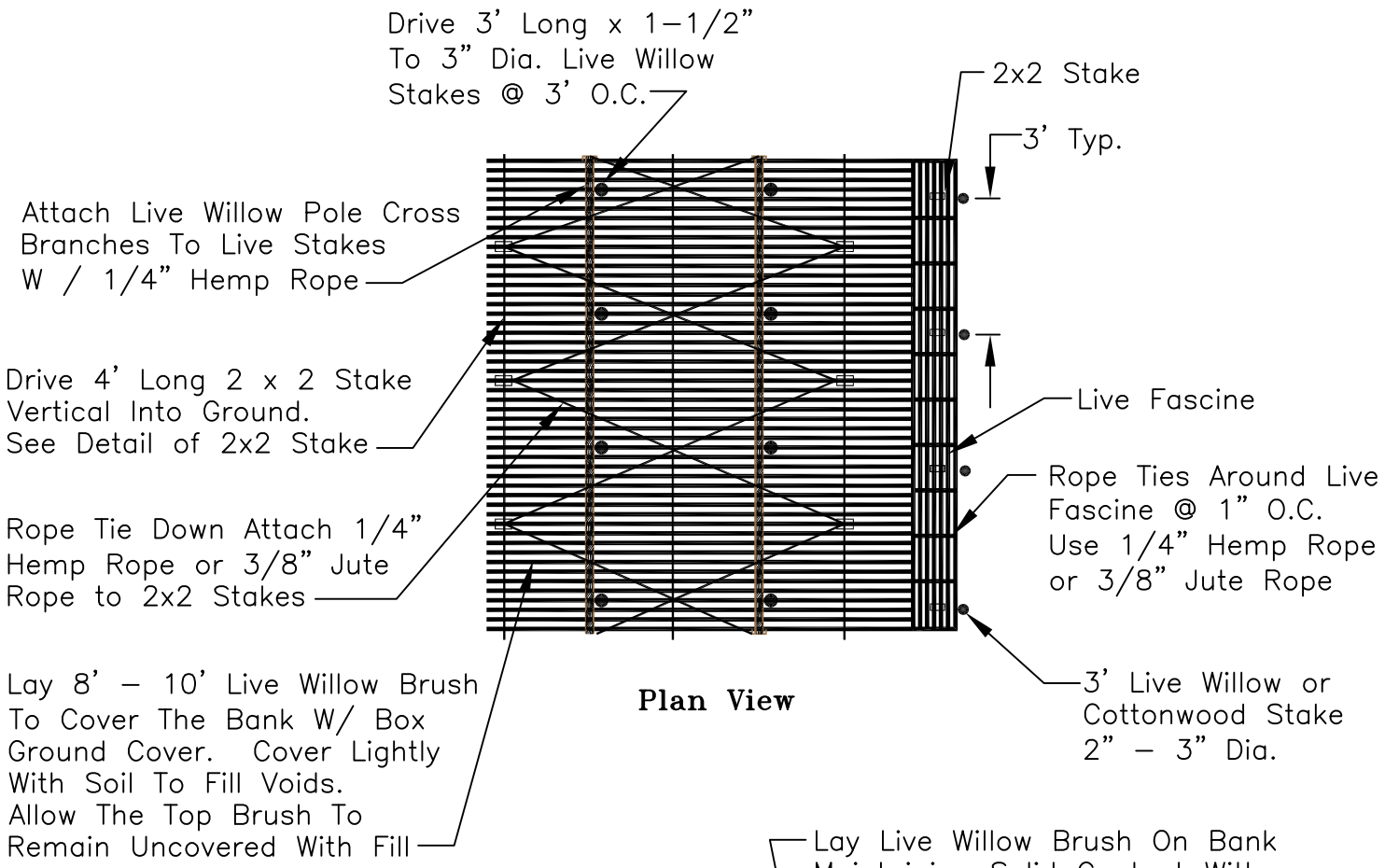
Habitat Impact Assessment:

In-stream: Enhances biotic resources
Stream-side: Enhances biotic resources

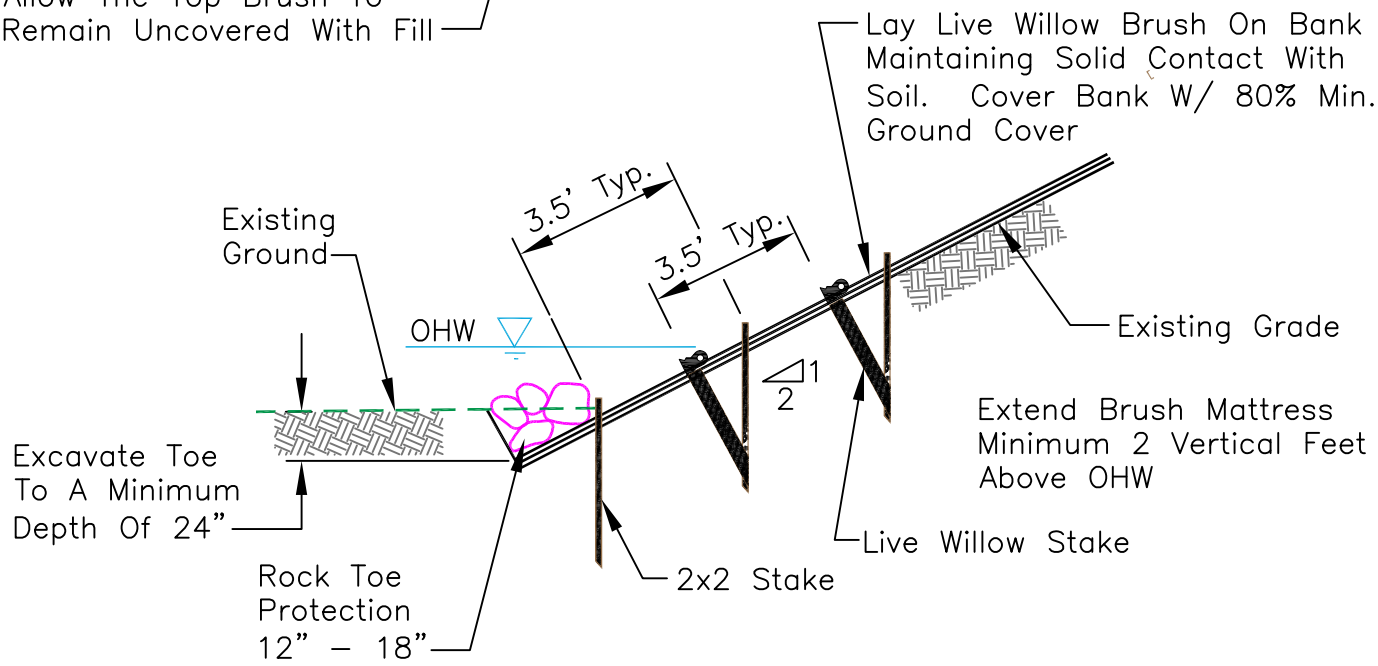
[1]Source: California Department of Fish and Game. California Salmonid Stream Habitat Restoration Manual

[2]Source: Natural Resources Conservation Service. Stream Corridor Restoration Principles, Processes and Practices

Bank Stabilization Measures
#4: Brush Mattress (Brush Layering)



Plan View



Source: Natural Resources Conservation Service, Stream Corridor Restoration Principles, Processes and Practices

SECTION

#4A: Brush Mattress (Brush Layering) with Boulder Toe

Description:

The lower portion of the eroded slope (below ordinary high water, OHW) is graded at a maximum of 1.5:1 slope. The upper portion of the slope is graded at a minimum slope of 2:1 and smoothed to ensure all plantings are in contact with soil. Appropriately-sized boulders are placed at the toe of the rebuilt bank up to the ordinary high water elevation. Voids between the boulders can be planted using live stakes.

A minimum 2-foot deep trench is dug at the top of the boulder line for the butt ends of the branches. Wood, steel, or live stakes are partially driven in rows on three foot centers in the area that will be covered by the mattress. After the stakes have been placed, live branches are put on the bank with their butt ends in the trench. Straight branches no shorter than 4 feet in length and ½-inch to 1-inch in diameter are used. If the branches are not long enough to reach the upper end of the mattress, several layers may be used; however, it is necessary to "shingle" the layers by lapping each new layer over the one below by at least 18 inches. Once the bank is covered by a thick layer of willows, cross branches are placed horizontally over the bottom layer. These branches are placed against the stakes and then tied to the stakes using wire or string. The stakes are then driven into the bank a minimum of two feet or deeper, if possible. After the completion of the mattress, the toe trench is back filled with boulders and rocks to anchor the butt ends of the branches. The entire mattress is then covered by earth or fine stream material[1].

This method forms an immediate protective cover over the stream bank, captures sediment during flood flows, and rapidly restores riparian vegetation and streamside habitat. This method should not be used on slopes that are experiencing ongoing mass movement or other slope instability[2].

Design Criteria

Appropriate on bank slopes of 2:1 or flatter for brush mattress section of slope. 1.5:1 or flatter for the boulder section.

Boulders must be keyed in (minimum 3-foot depth) at toe of bank.

Appropriate for local stream velocities of 6 feet per second or less.

Habitat Impact Assessment:

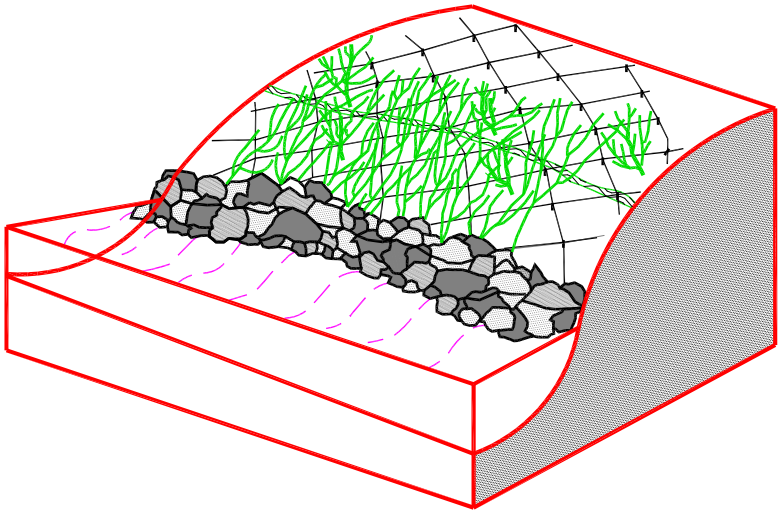
In-stream: Enhances biotic resources
Stream-side: Enhances biotic resources

[1]Source: Adapted from California Department of Fish and Game. California Salmonid Stream Habitat Restoration Manual

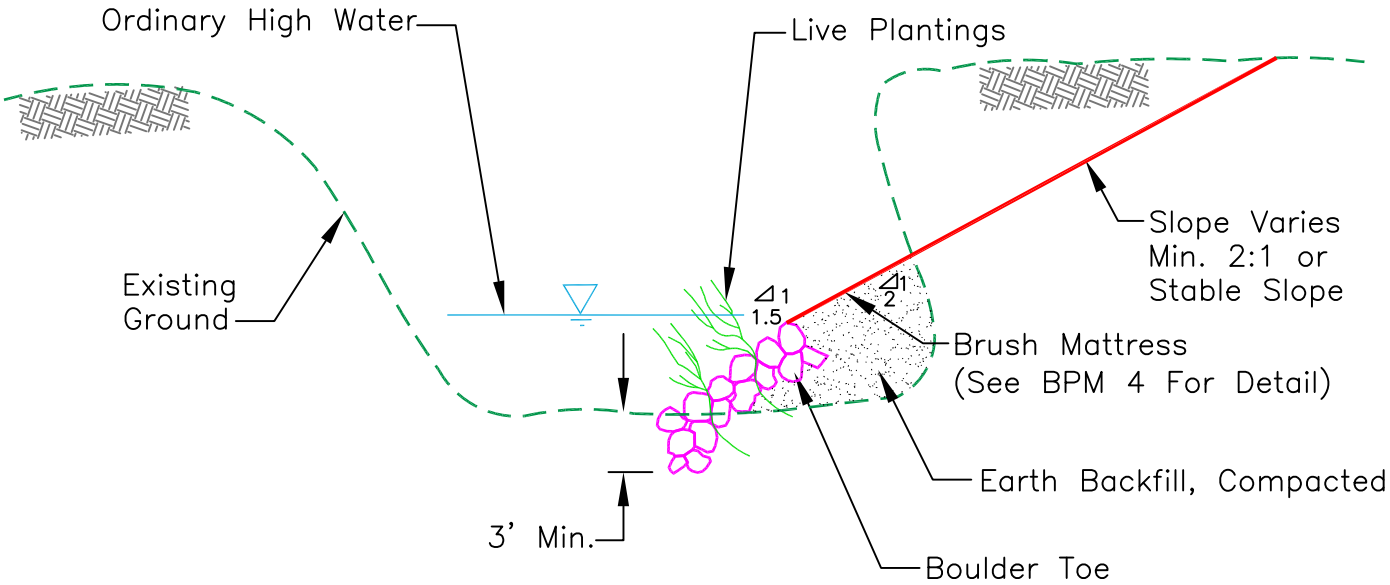
[2]Source: Natural Resources Conservation Service. Stream Corridor Restoration Principles, Processes and Practices

Bank Stabilization Measures

#4A: Brush Mattress (Brush Layering) with Boulder Toe



Source: Adapted from Natural Resources Conservation Service, Stream Corridor Restoration Principles, Processes and Practices



SECTION

Bank Stabilization Measures

#4B: Brush Mattress (Brush Layering) with Log Toe

Description:

Brush mattress with log toe consists of grading the upper and lower portions of the eroded slope (below and above ordinary high water, OHW) at a minimum of 2:1 and maximum of 1.5:1 slopes respectively, and smoothed to ensure all willows are in contact with soil. Logs are placed at the toe of the native bank up to the OHW[1]. Where applicable and or available, rootwads may be used in combination with logs.

A maximum 2-foot deep trench is dug at the top of the log toe for the butt ends of the willow branches. Wood, steel, or live willow stakes are partially driven in rows on three-foot centers in the area that will be covered by the mattress. After the stakes have been placed, live branches are put on the bank with their butt ends in the trench. Straight branches no shorter than 4 feet in length and ½-inch to 2-inch in diameter are used. If the branches are not long enough to reach the upper end of the mattress, several layers may be used; however, it is necessary to "shingle" the layers by lapping each new layer over the one below by at least 18 inches. Once the bank is covered by a thick layer of willows, cross branches are placed horizontally over the bottom layer. Stakes are then driven into the bank as deep as possible. These branches are placed against the stakes and then tied to the stakes using biodegradable wire or string. After the completion of the mattress, the toe trench is back filled with logs to anchor the butt ends of the branches. The entire mattress is then covered by earth or fine stream material[1].

This method forms an immediate protective cover over the stream bank, captures sediment during flood flows, and rapidly restores riparian vegetation and streamside habitat. This method should not be used on slopes that are experiencing ongoing mass movement or other slope instability[2].

Design Criteria

Appropriate on bank slopes of 2:1 or flatter for brush mattress section of slope. 1.5:1 or flatter for the log toe section.

Install log toe with anchors. Moisture conditions and availability of water year-round determines appropriate vegetation species.

Appropriate for local stream velocities of 15 feet per second or less.

Habitat Impact Assessment:

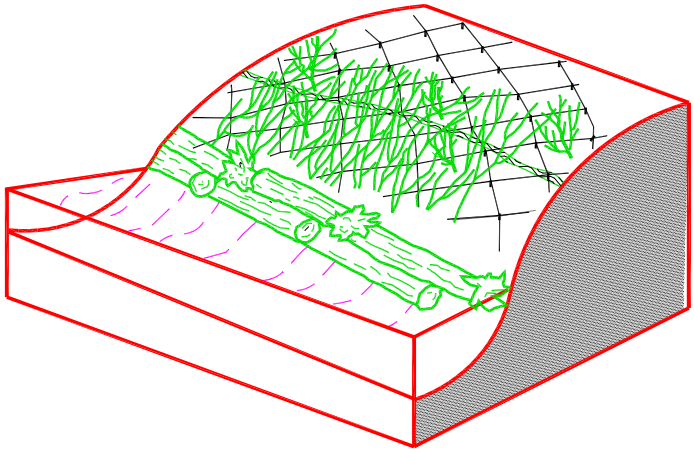
In-stream: Enhances biotic resources
Stream-side: Enhances biotic resources

[1]Source: Adapted from Natural Resources Conservation Service. Stream Corridor Restoration Principles, Processes and Practices

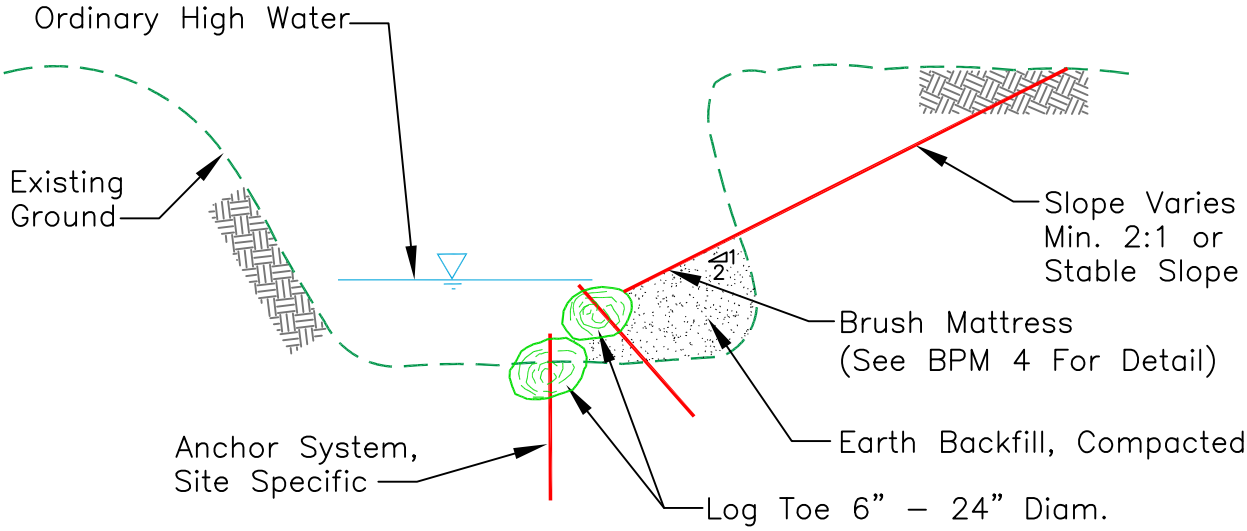
[2]Source: California Department of Fish and Game. California Salmonid Stream Habitat Restoration Manual

Bank Stabilization Measures

#4B: Brush Mattress (Brush Layering) with Log Toe



Source: Natural Resources Conservation Service, Stream Corridor Restoration Principles, Processes and Practices



Source: Adapted from California Department of Fish and Game. California Salmonid Stream Habitat Restoration Manual

SECTION

#5: Surface Matting (Erosion Mats)

Description:

This method consists of securing plastic, jute, or geotextile erosion control fabric to channel banks using stakes or staples. These materials provide soft armor protection against erosive forces and are combined with live staking and direct seeding. Abrasive sediment, debris, foot traffic, and sunlight will wear, snag, and tear these fabrics with time, potentially undermining the structure. These methods are intended to be the skeleton of a vegetated erosion control system. The establishment of vegetation is crucial to the long-term success of erosion mats.

Work best in small, uniform, improved channels with mild bank slopes. This method has good revegetation potential. Toe protection is required where toe scour is anticipated (see bank stabilization measures 5A and 5B).

Design Criteria:

Appropriate on bank slopes of 2:1 or flatter.

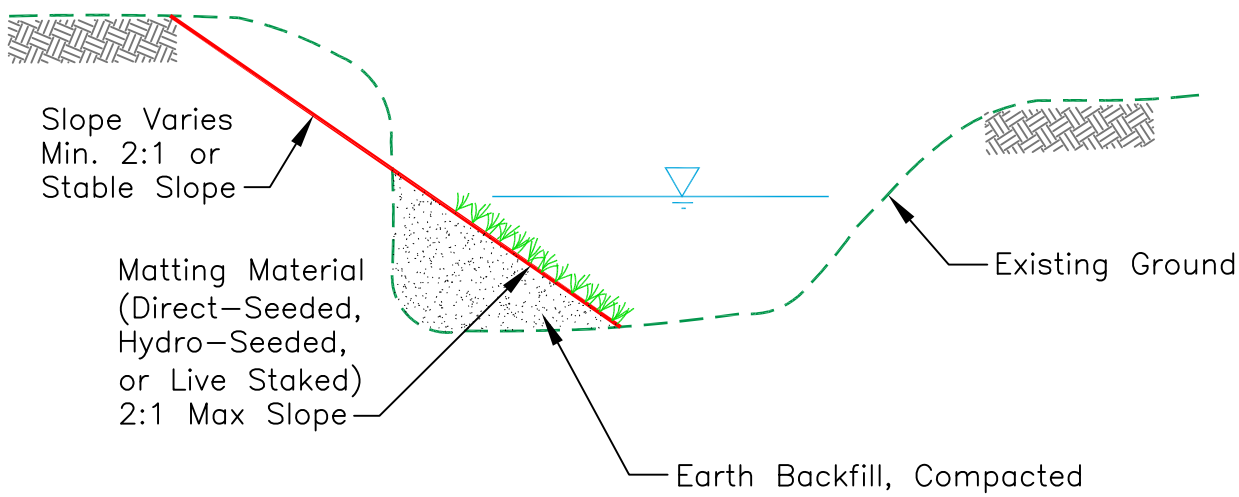
Typically appropriate for local stream velocities of 12 feet per second or less depending on the type of erosion mat and revegetation method selected.

Habitat Impact Assessment:

In-stream: Enhances biotic resources
Stream-side: Enhances biotic resources

Bank Stabilization Measures

#5: Surface Matting (Erosion Mats)



SECTION

#5A: Surface Matting (Erosion Mats) with Boulder Toe

The lower portion of the eroded slope (below ordinary high water, OHW) is graded at a maximum of 1.5:1 slope. The upper portion of the slope is graded at a minimum slope of 2:1 and smoothed to ensure erosion mat is in full contact with soil. Appropriately-sized boulders are placed at the toe of the rebuilt bank up to the ordinary high water elevation. Voids between the boulders can be planted using live stakes.

In the upper portion of the slope, plastic, jute, or geotextile erosion control fabric is attached to channel banks using staking or staples. These materials provide soft armor protection against erosive forces and are combined with live staking and direct seeding. Debris, foot traffic, and sunlight will wear, snag, and tear these fabrics with time. The boulder toe protection will prevent undermining of the structure. These methods are intended to be the skeleton of a vegetated erosion control system.

Work best in uniform improved channels with mild bank slopes. This method has good revegetation potential.

Design Criteria:

Appropriate on bank slopes of 2:1 or flatter for erosion mat section of slope. 1.5:1 or flatter for the boulder section.

Boulders must be keyed in (minimum 3-foot depth) at toe of bank.

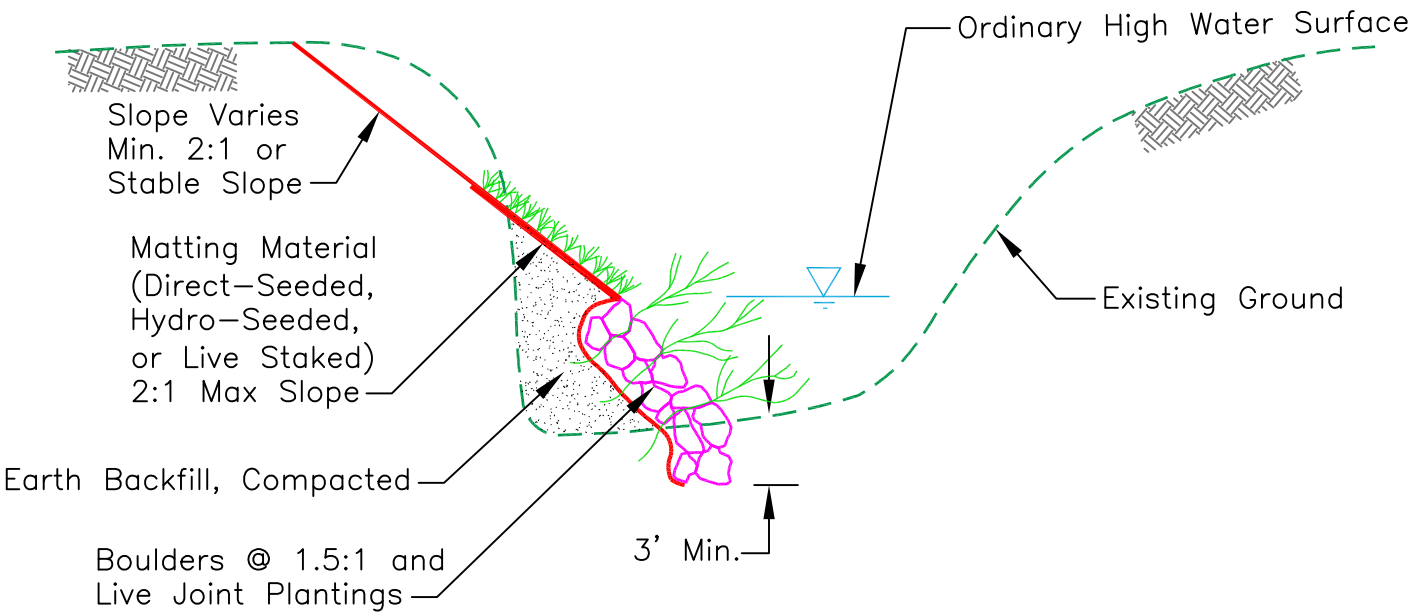
Appropriate for local stream velocities of 6 feet per second or less if boulders are planted with live stakes. 12 feet per second if boulders are not planted.

Habitat Impact Assessment:

In-stream: Enhances biotic resources
Stream-side: Enhances biotic resources

Bank Stabilization Measures

#5A: Surface Matting (Erosion Mats) with Boulder Toe



SECTION

#5B: Surface Matting (Erosion Mats) with Log Toe

Description:

Surface matting with log toe consists of grading the upper and lower portions of the eroded slope (below and above ordinary high water, OHW) at a minimum of 2:1 and maximum of 1.5:1 slopes respectively, and smoothed to ensure erosion mat is in full contact with soil. Logs are placed at the toe of the native bank up to the OHW. Where applicable and/or available, rootwads may be used.

In the upper portion of the slope, plastic, jute, or geotextile erosion control fabric is attached to channel banks using stakes, staples, or anchors. These materials provide soft armor protection against erosive forces and are combined with live staking and/or direct seeding. Debris, foot traffic, and sunlight may wear, snag, and tear these fabrics with time. The log toe protection will prevent undermining of the structure. These methods are intended to be the skeleton of a vegetated erosion control system.

This repair type works best in uniform improved channels with mild bank slopes and has good revegetation potential.

Design Criteria:

Appropriate on bank slopes of 2:1 or flatter for erosion mat section of slope. 1.5:1 or flatter for the boulder section.

Install log toe with anchors. Moisture conditions and availability of water year-round determines appropriate vegetation species.

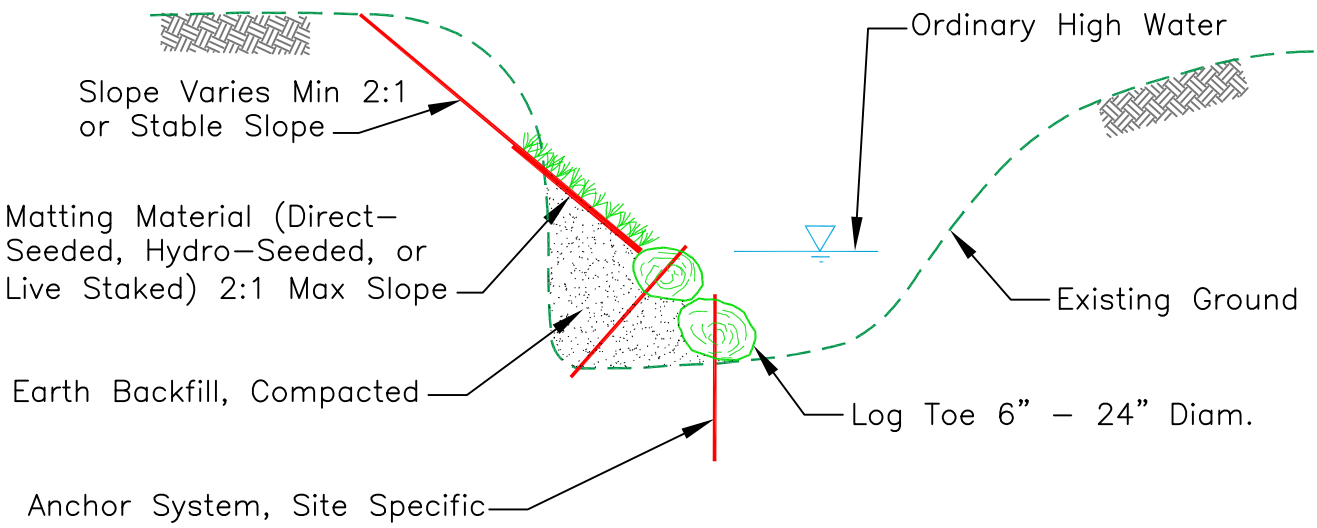
Appropriate for local stream velocities of 15 feet per second or less.

Habitat Impact Assessment:

In-stream: Enhances biotic resources
Stream-side: Enhances biotic resources

Bank Stabilization Measures

#5B: Surface Matting (Erosion Mats) with Log Toe



SECTION

#6: Add Rock to Invert

Description:

This is a technique most commonly used to armor a channel invert susceptible to incision or scour downstream of various control structures such as bridges or concrete channels. Rock channel bottoms can also be valuable in terms or reoxygenation of water in the creek. This installation method can also retard stream turbidity in many cases[1].

Rocks are placed in scour holes or along the invert for the appropriate length depending on the length and depth of repair needed. This can include scour holes just downstream of a drop structure that needs armoring, or an entire reach of channel can be armored with well-graded, angular rock to stop incision. If lining a long length of channel, rocks can be formed into a concave shape and a key can be constructed every few hundred feet to stabilize the lining.

Design Criteria:

Appropriate for incised channels or scour holes downstream of a concrete portion of creek.

Habitat Impact Assessment:

In-stream: Enhances biotic resources
Stream-side: Enhances biotic resources

[1]Source: Santa Clara Valley Water District, Design Manual, Open Channel Hydraulics and Sediment Transport, June 2009

Bank Stabilization Measures

#6: Add Rock to Invert

(No drawing included for this bank stabilization measure;
please refer to narrative for more information)

Bank Stabilization Measures

#6A: Rock Cross Vanes

Description:

The cross-vane is a grade control structure that decreases near-bank shear stress, velocity and stream power, but increases the energy in the center of the channel. The structure will establish grade control, reduce bank erosion, create a stable width/depth ratio, and maintain channel capacity, while maintaining sediment transport capacity and sediment competence. The cross-vane is also a stream habitat improvement structure.

The cross-vane is typically composed of a row of header rocks and a row of footer rocks. The header rocks can be installed with half of its size embedded below the final grade. The footer rocks are installed downstream of and at a lower elevation than the header rocks to provide support. The top of the footer rocks are positioned at the final grade[2].

With the channel boundary opening up at the floodplain level, the vane may be properly keyed into the side slopes, an advantage not easily afforded by incised channels[2]. Each leg of the vane typically makes an angle of 20-30 degrees with the bank[1].

Design Criteria:

Appropriate in “B” and “F” type channels, according to Rosgen’s stream classification system.

Habitat Impact Assessment:

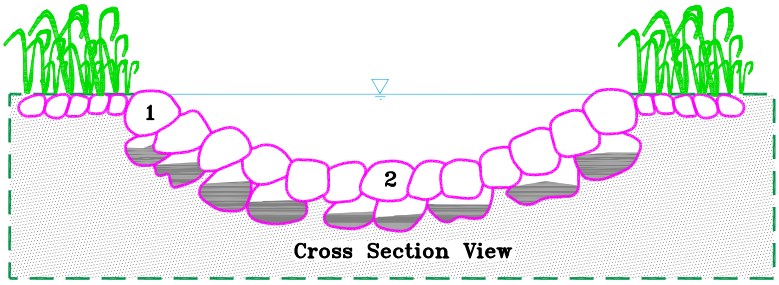
In-stream: Enhances biotic resources
Stream-side: Enhances biotic resources

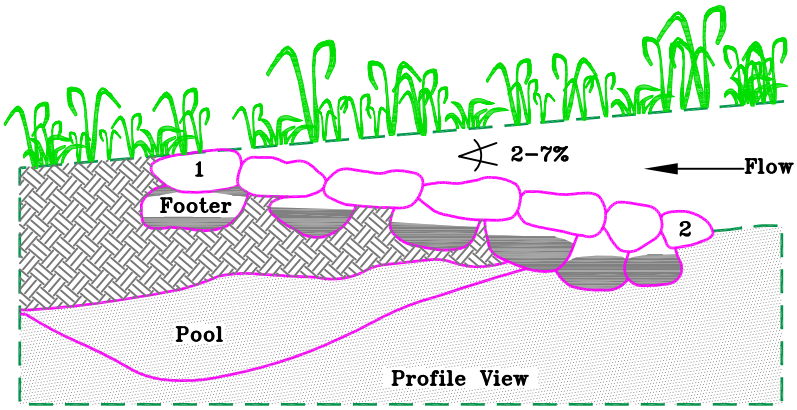
[1]Source: Wildland Hydrology, Inc.; Rosgen, David L.P.H.; “The Cross-Vane, W-Weir and J-Hook Vane Structures…Their Description, Design and Application for Stream Stabilization and River Restoration”.

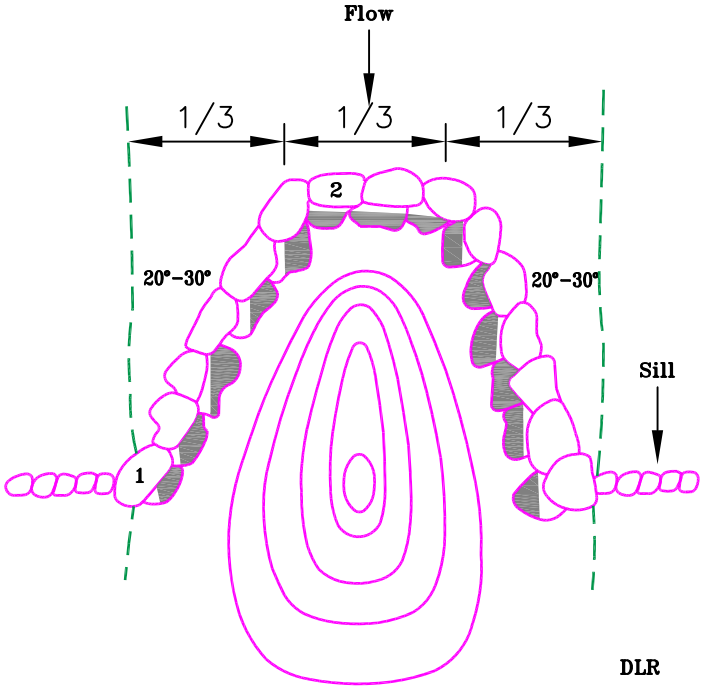
[2]Source: Santa Clara Valley Water District, Design Manual, Open Channel Hydraulics and Sediment Transport, June 2009

Bank Stabilization Measures

#6A: Rock Cross Vanes







Plan View

Source: Wildland Hydrology, Inc.: Rosgen, David L, P.H.; "The Cross-Vane, W-Weir and J-Hook Vane Structures... Their Description, Design and Application for Stream Stabilization and River Restoration".

Bank Stabilization Measures

#6B: Root Wads and Boulders

Description:

This method combines boulders, logs, and live plant material to armor a stream bank. Fish habitat is enhanced in addition to creating a natural-looking bank stabilization structure[1].

Footer logs are set in a toe trench below the thalweg line with the channel end pointed downstream and the butt end angled 45 to 60 degrees upstream. A second log (with root wad) is set on top of the footer log diagonally, forming an "X". The root wad end is set pointing upstream and the butt end lying downstream 45 to 60 degrees. The apex of the logs is anchored together using boulders, re-bar or cables. Large boulders are placed on top and between the logs at each apex. After all the logs and boulders are set in place, live plant material such as willows is placed within the spaces of the structure, behind the boulders. Excavated gravel and stream materials can then be placed over the bank end portion of the structure.

This method will tolerate high boundary shear stresses if logs and root wads are well-anchored. This method should, where appropriate, be used in conjunction with soil bioengineering or live vegetation plantings to stabilize the upper bank and ensure a regenerative source of streambank vegetation. The life of the structure depends on the species of logs used. It might need replacement if vegetative colonization does not take place. This method can create local scour (channel bottom) and erosion (opposite bank)[2].

Design Criteria:

Appropriate for channel velocities at 10 feet per second or less.

Habitat Impact Assessment:

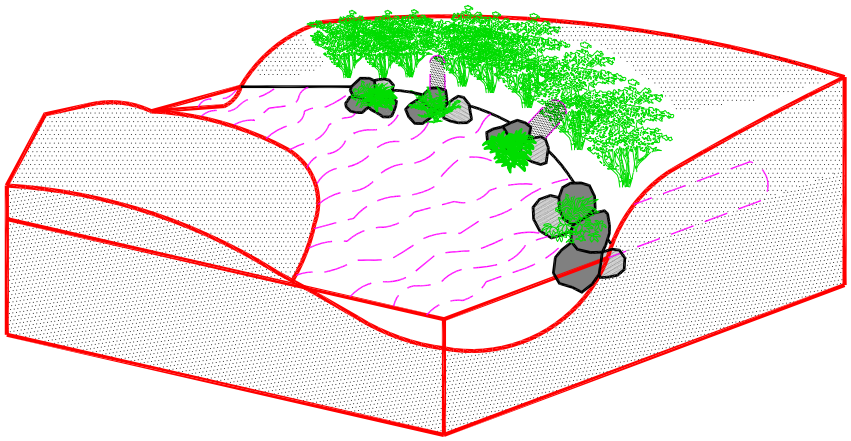
In-stream: Enhances biotic resources
Stream-side: Enhances biotic resources

[1]Source: California Department of Fish and Game. California Salmonid Stream Habitat Restoration Manual

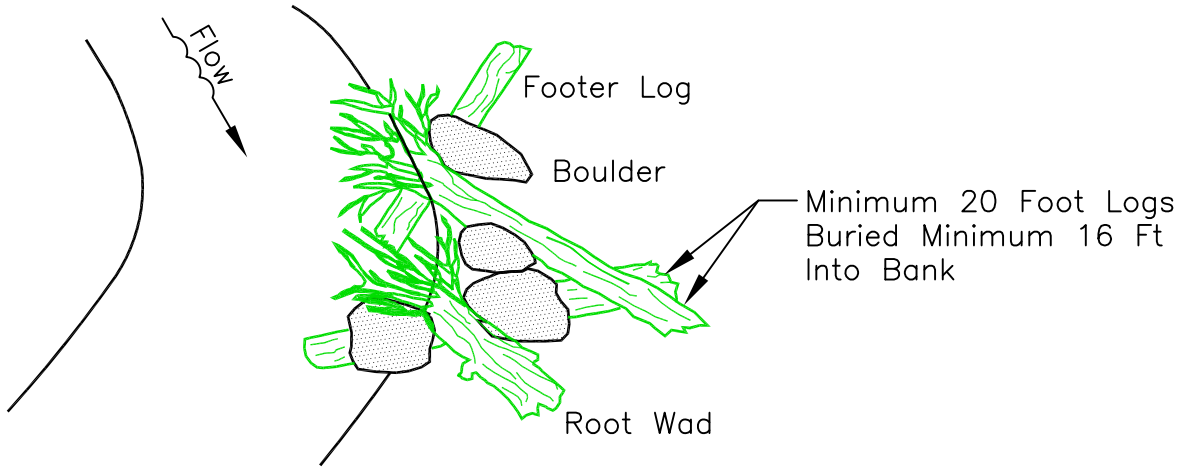
[2]Source: Natural Resources Conservation Service. Stream Corridor Restoration Principles, Processes and Practices

Bank Stabilization Measures

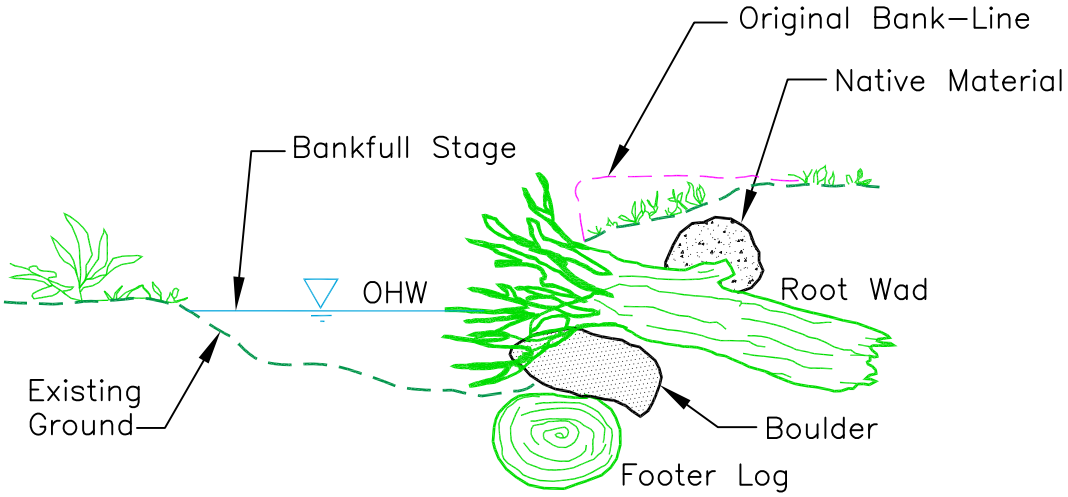
#6B: Root Wads and Boulders



Source: Adapted from Natural Resources Conservation Service, Stream Corridor Restoration Principles, Processes and Practices



Plan



SECTION

Source: Adapted from California Department of Fish and Game. California Salmonid Stream Habitat Restoration Manual

Bank Stabilization Measures

#6C: Live Log Crib Walls

Description:

Log crib walls are used to reduce sediment input and protect banks in areas where logs are available and boulders are not practical[1]. Cribbing provides protection in areas with near-vertical banks where bank sloping options are limited by issues such as right of way restrictions[2]. Crib walls afford a natural appearance, immediate protection, and accelerate the establishment of woody species[2]. This method is effective on the outside of bends where high velocities are present and in situations where a low wall may be required to stabilize the toe and reduce slope steepness[2]. This method does not adjust to toe scour and should be used in combination with soil bioengineering systems and live plantings to stabilize the upper slopes[2]. Logs should be selected for soundness, durability, uniformity of size, and ease of handling (straight logs much preferred) and delivery.

Two rows of base logs or untreated timbers are placed in trenches below stream grade to prevent undercutting of the structure. Base logs should be as large (long and thick) as can be manipulated while conforming to the contour of the stream bank. Good base logs are crucial to ensure stability and durability of the cribwall[1]. Geotextile fabric should be placed behind and inside the face of (to keep material in) the structure. Tie-back logs are notched, nailed, or bolted into the base logs and placed at regular intervals (6 to 8 feet typically) along the base logs. Tie-back logs are attached to both rows of base logs. Once the first row of tie-back logs has been connected a second set of face logs is placed on top of the tie-backs. These logs are placed approximately 6 inches back into the slope. This procedure is repeated until the desired level of bank protection is achieved. As each lift is constructed, the face logs and tie-backs are filled with a mix of gravel and cobbles to the top of the face log. It is not necessary to use topsoil in the fill material; but there should be sufficient fine grained material to insure vegetation growth. Live cuttings are then laid in to form a complete cover layer. These live branches should be long enough to have their butt end in the native soil behind the crib wall. The tips should stick out of the crib wall no more than a quarter of the cutting total length. The branches are then covered with gravel/cobble mix to the top of the tie-backs and the nest layer is continued.

Design Criteria:

Appropriate for slopes up to ¼ to 1.

Appropriate for velocities from 6 feet per second up to 12 feet per second, depending on opening size.

Habitat Impact Assessment:

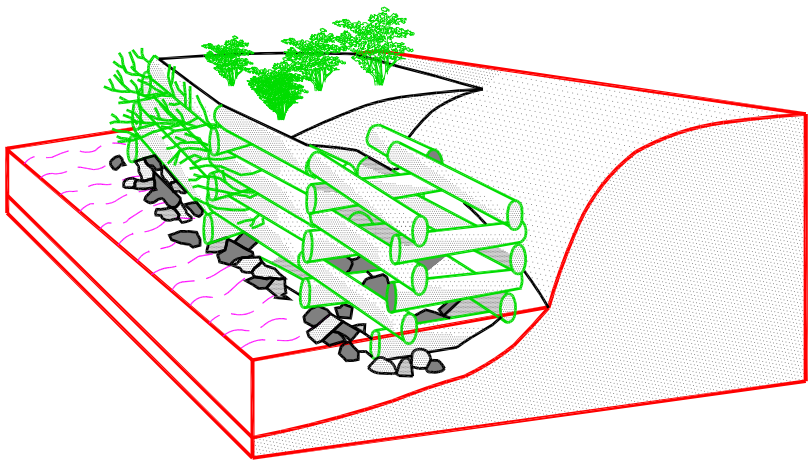
In-stream: Enhances biotic resources
Stream-side: Enhances biotic resources

[1]Source: California Department of Fish and Game. California Salmonid Stream Habitat Restoration Manual

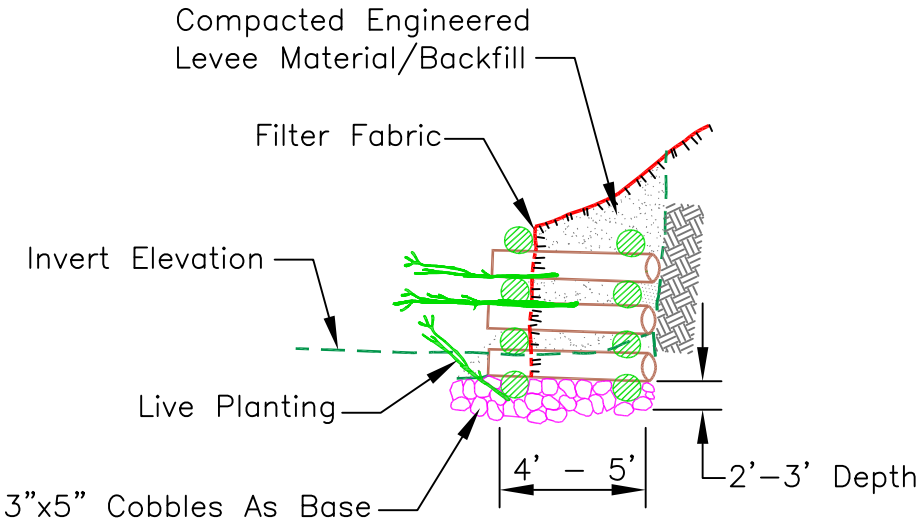
[2]Source: Natural Resources Conservation Service. Stream Corridor Restoration Principles, Processes and Practices

Bank Stabilization Measures

#6C: Live Log Crib Walls



Source: Natural Resources Conservation Service, Stream Corridor Restoration Principles, Processes and Practices



Source: Adapted from California Department of Fish and Game. California Salmonid Stream Habitat Restoration Manual

#6D: Log Revetment

Description:

For sites where erosion has cut out the toe and a portion of a steep bank and there is no room for shaping back the bank slope, log revetment may be used for bank repair. Log revetment is a stack of logs that forms the protected bank slope with compacted soil backfill behind the logs. Each individual log is anchored to the foundation and rebar is used to connect logs to each other. The logs are cut to fit the size of the eroded bank. There is minimal excavation except to clear away debris and loose materials. Live tree roots are saved as much as possible by burying them in the soil backfill[1].

Log revetment will be mitered to match the upstream and downstream bank slopes. The bottom log of the log revetment is aligned with the upstream and downstream toe line to minimize encroachment into the flow area[1]. Two adjacent logs are laid below grade to act as a footing for the structure. These footer logs are anchored into the native ground using either rebar or duckbill anchors and cable, or some other site-appropriate anchoring method. Logs are then stacked one on top of the other, at the appropriate slope, and are rebarred to one another. Each log is anchored into existing ground using duckbill anchors and cable, rebar, or another site-appropriate method, until the appropriate height is obtained.

Design Criteria:

Appropriate on steep bank slopes ½:1 or flatter.

Appropriate for velocities up to 15 feet per second.

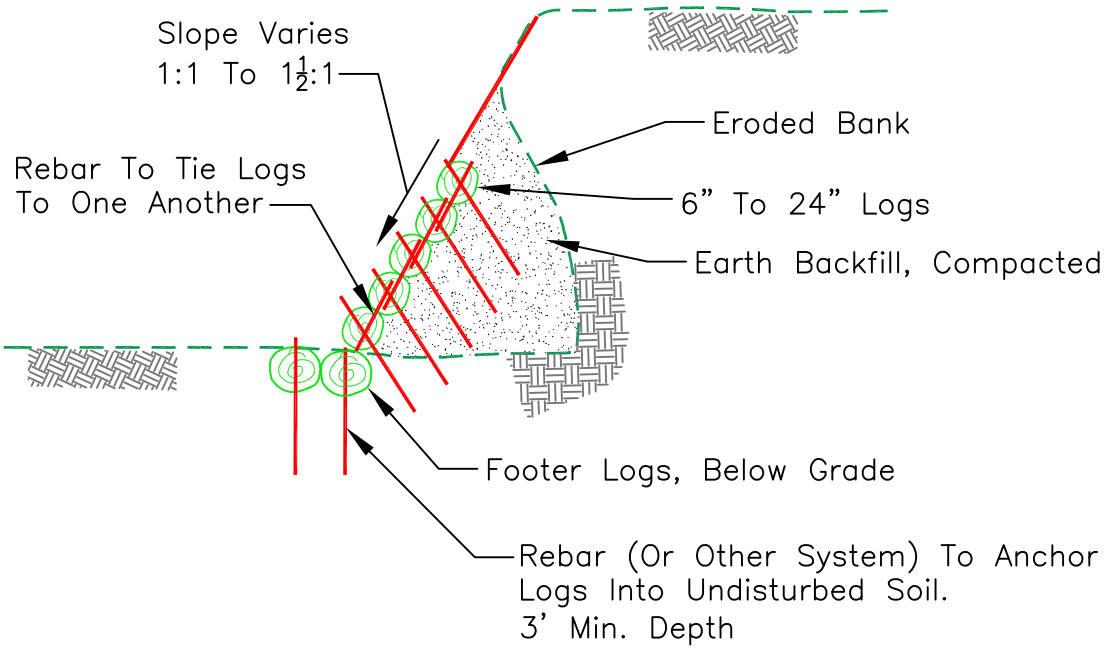
Habitat Impact Assessment:

In-stream: Enhances biotic resources
Stream-side: Enhances biotic resources

[1]Source: Santa Clara Valley Water District, Design Manual, Open Channel Hydraulics and Sediment Transport, June 2009

Bank Stabilization Measures

#6D: Log Revetment



#7: Cellular Confinement System

Description:

Soil cellular confinement system (geocell) is a polyethylene plastic cellular system where structural strength is developed by the composite design of soil, plant roots, and the plastic's cellular configuration. This system is available in 8-inch deep honeycomb mats that are installed in offset vertical layers to create terraced planting areas. The honeycomb cells are filled with soil, moderately compacted, and planted with woody vegetation and grasses. The structure functions similarly to a crib wall structure.

This method has the capability of developing some vegetation potential.

Design Criteria:

Appropriate for slopes up to ½ to 1.

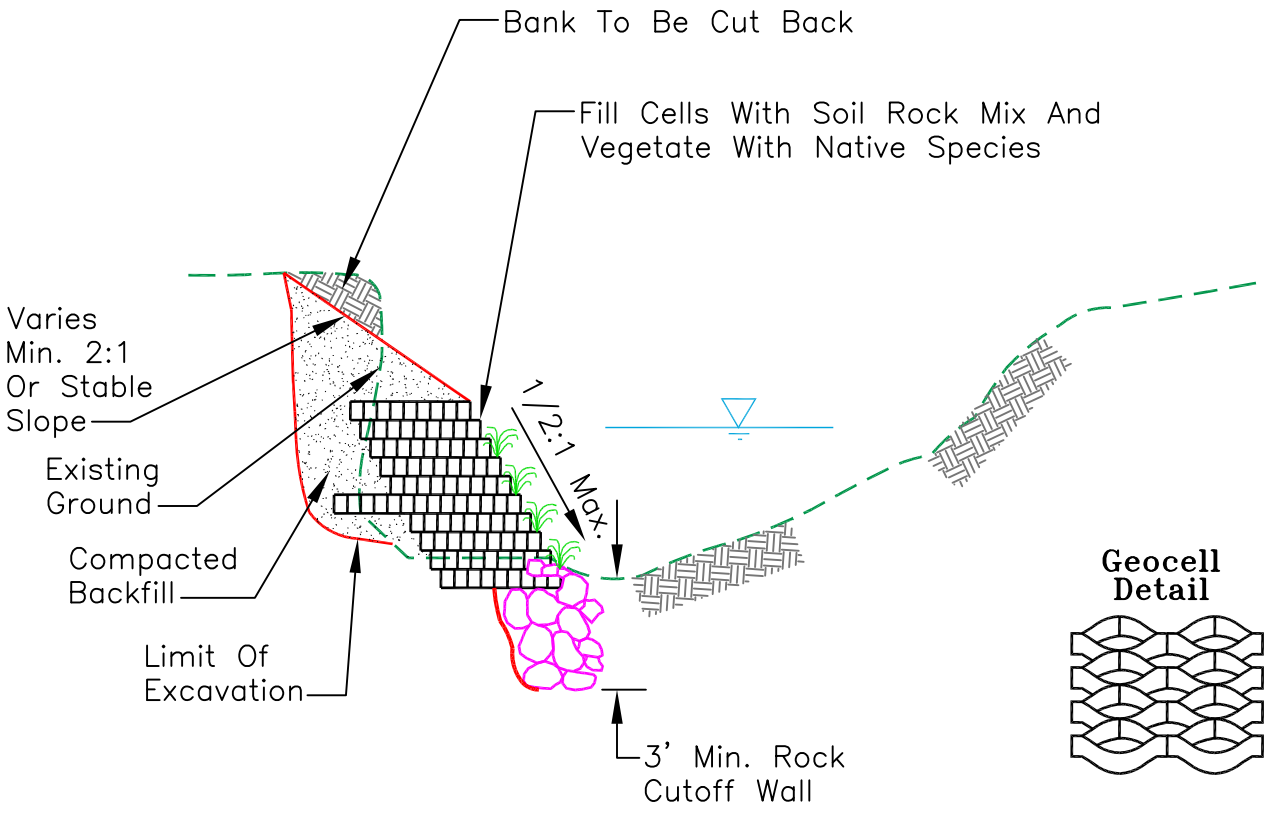
Appropriate for velocities up to 6 feet per second.

Habitat Impact Assessment:

In-stream: Enhances biotic resources
Stream-side: Enhances biotic resources

Bank Stabilization Measures

#7: Cellular Confinement System



#8: Rock Blanket

Description:

This method consists of placing a blanket of appropriately-sized rock over the bank to control erosion. Smaller cobbles may be placed in the voids of the rock to create a solid structure so as to minimize scour behind the rock and failure of the structure. This method is appropriate where long-term durability is needed, design discharge is high, there is significant threat to life or property, or there is no practical way to otherwise incorporate vegetation into the design. This method should, where appropriate, be used with soil-bioengineering systems or live vegetation to stabilize the upper bank and ensure a regenerative source of streambank vegetation. A major benefit to this method is that the components are flexible and function is not impaired by slight movement from settlement or other adjustments[1].

Angular rock should be used, because they tend to interlock, making the structure act like a single structure rather than a collection independent stones.

Design Criteria:

Appropriate for slopes up to 1.5 to 1, preferably 2 to 1.

Rock sizes of 6 inches to 18 inches in diameter.

Appropriate for velocities up to 15 feet per second.

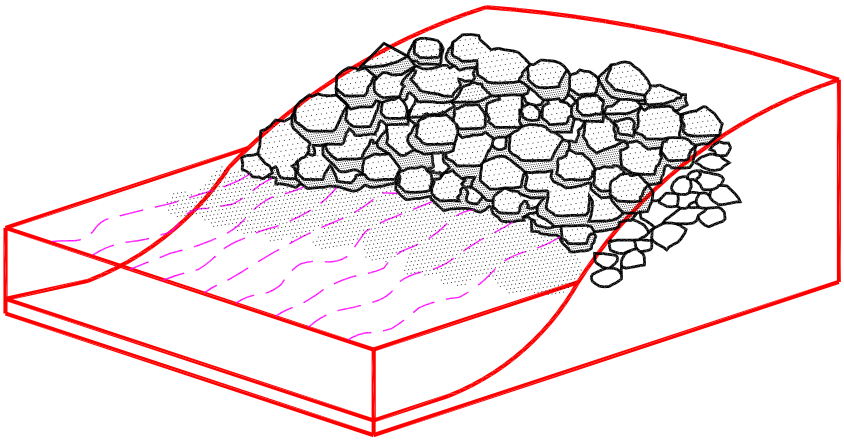
Habitat Impact Assessment:

In-stream: Enhances biotic resources
Stream-side: Enhances biotic resources

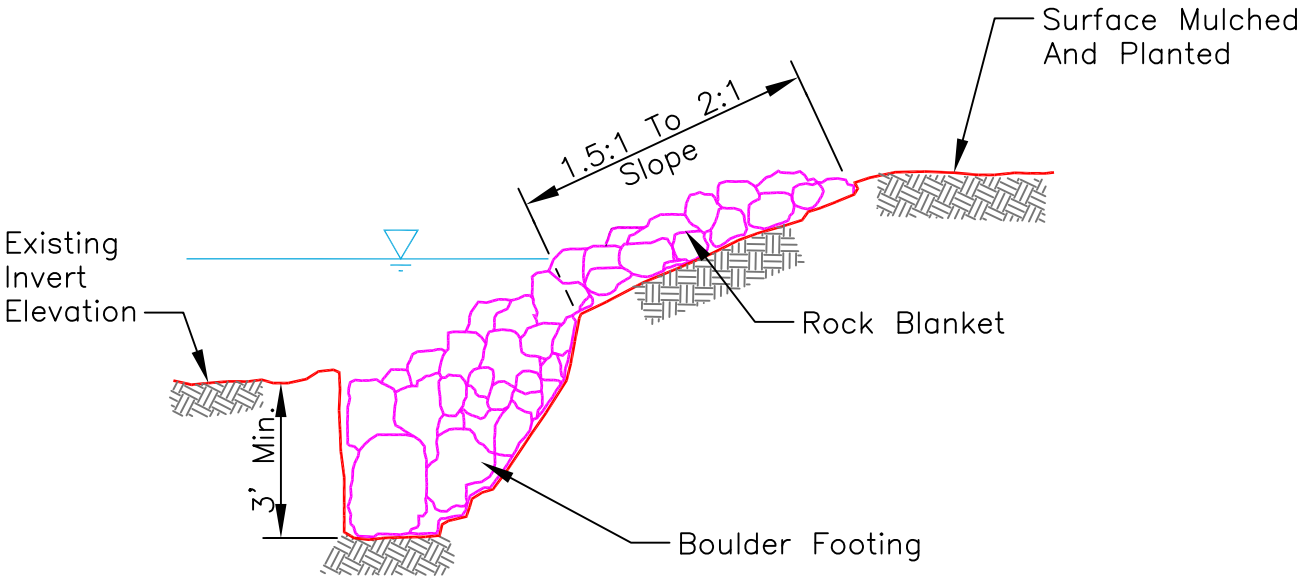
[1]Source: Adapted from Natural Resources Conservation Service. Stream Corridor Restoration Principles, Processes and Practices

Bank Stabilization Measures

#8: Rock Blanket



Source: Natural Resources Conservation Service, Stream Corridor Restoration Principles, Processes and Practices



Source: Adapted from California Department of Fish and Game. California Salmonid Stream Habitat Restoration Manual

Bank Stabilization Measures

#8A: Boulder Revetment

Description:

Boulder revetment is a method for armoring stream banks with large boulders for preventing bank erosion. Revetment footing is laid in a “toe” trench dug along the base of the bank. Large boulders are then laid on the bank slopes up to the design water surface level (ordinary high water or other design water surface). Large angular boulders are best suited for this purpose. Boulder revetment can provide protection in areas where log or boulder instream structures may lead to bank erosion. The boulders used should be dense and structurally competent[1].

Geotextile fabrics should be avoided, as they prevent the natural establishment of vegetation[1].

This method should, where appropriate, be used with soil bio-engineering systems or live vegetation to stabilize the upper bank and ensure a regenerative source of streambank vegetation. A major benefit of this method is that the components are flexible and function is not impaired by slight movement from settlement or other adjustments[2].

This structure would allow for some natural revegetation of the bank.

Design Criteria:

Appropriate for slopes up to 1 to 1, preferably 2 to 1.

Appropriate for velocities up to 6 feet per second if boulder joints are planted, 15 feet per second if boulders are not planted.

Habitat Impact Assessment:

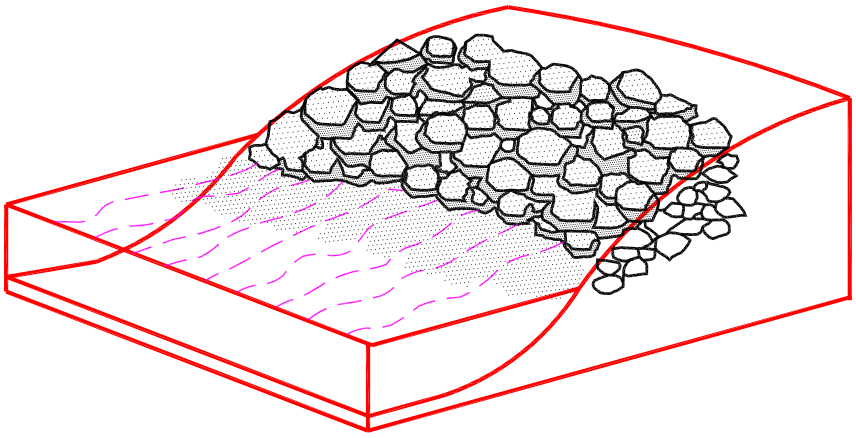
In-stream: Enhances biotic resources
Stream-side: Enhances biotic resources

[1]Source: Adapted from California Department of Fish and Game. California Salmonid Stream Habitat Restoration Manual

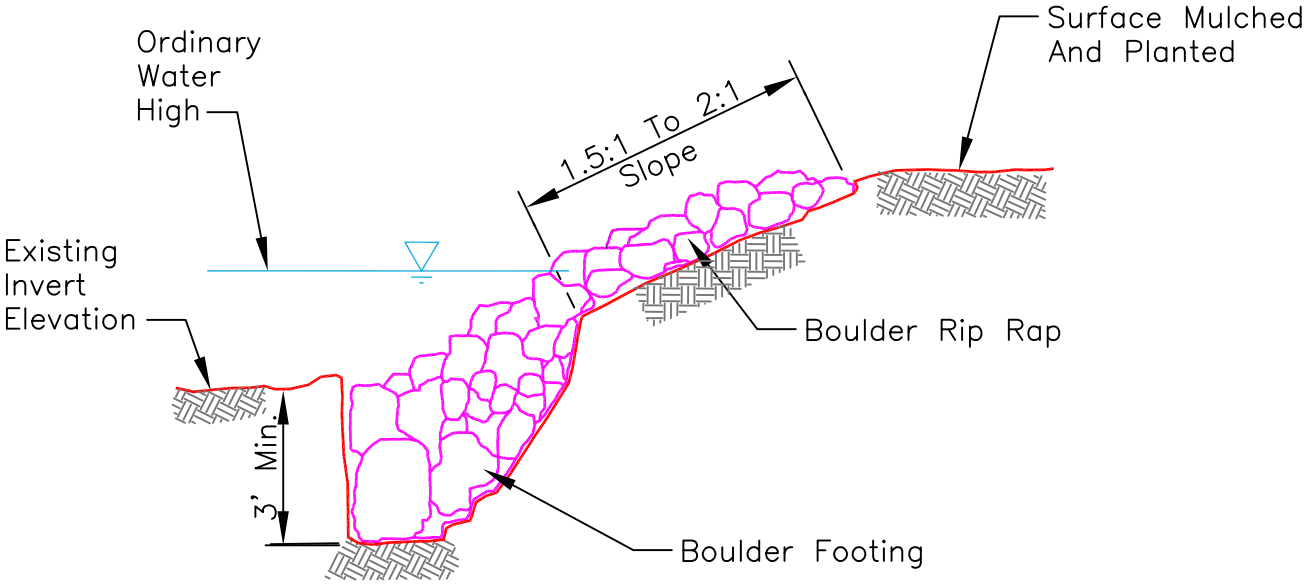
[2]Source: Natural Resources Conservation Service. Stream Corridor Restoration Principles, Processes and Practices

Bank Stabilization Measures

#8A : Boulder Revetment



Source: Natural Resources Conservation Service, Stream Corridor Restoration Principles, Processes and Practices



Source: Adapted from California Department of Fish and Game. California Salmonid Stream Habitat Restoration Manual

#8B: Boulder Revetment with Soil and Vegetation

Description:

Boulder revetment is a method for armoring stream banks with large boulders for preventing bank erosion. Revetment footing is laid in a “toe” trench dug along the base of the bank. Large boulders (are then laid on the bank slopes up to the ordinary high water or other design water surface. Large angular boulders are best suited for this purpose. Boulder revetment can provide protection in areas where log or boulder instream structures may lead to bank erosion. The boulders used should be dense and structurally competent[1].

Soil is placed over the boulders and vegetation is installed by staking and/or direct seeding. Bio-degradable erosion control mats may be placed over the soil to help control erosion until vegetation establishes itself. Special care must be taken in staking to avoid damage to the stakes’ cambium and to ensure good soil/water/stake contact. Thick revetment layers may require special tools for establishing staking pilot holes[2].

Geotextile fabrics should be avoided, as they prevent the natural establishment of vegetation[1].

This method should, where appropriate, be used with soil bio-engineering systems or live vegetation to stabilize the upper bank and ensure a regenerative source of streambank vegetation. A major benefit of this method is that the components are flexible and function is not impaired by slight movement from settlement or other adjustments[2].

Design Criteria:

Appropriate for slopes up to 1 to 1, preferably 2 to 1.

Appropriate for velocities up to 6 feet per second.

Habitat Impact Assessment:

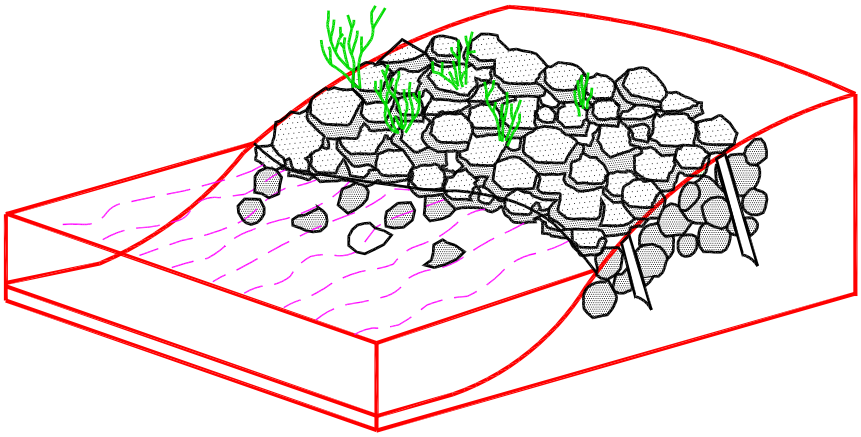
In-stream:	Enhances biotic resources
Stream-side:	Provides limited biotic resources

[1]Source: Adapted from California Department of Fish and Game. California Salmonid Stream Habitat Restoration Manual

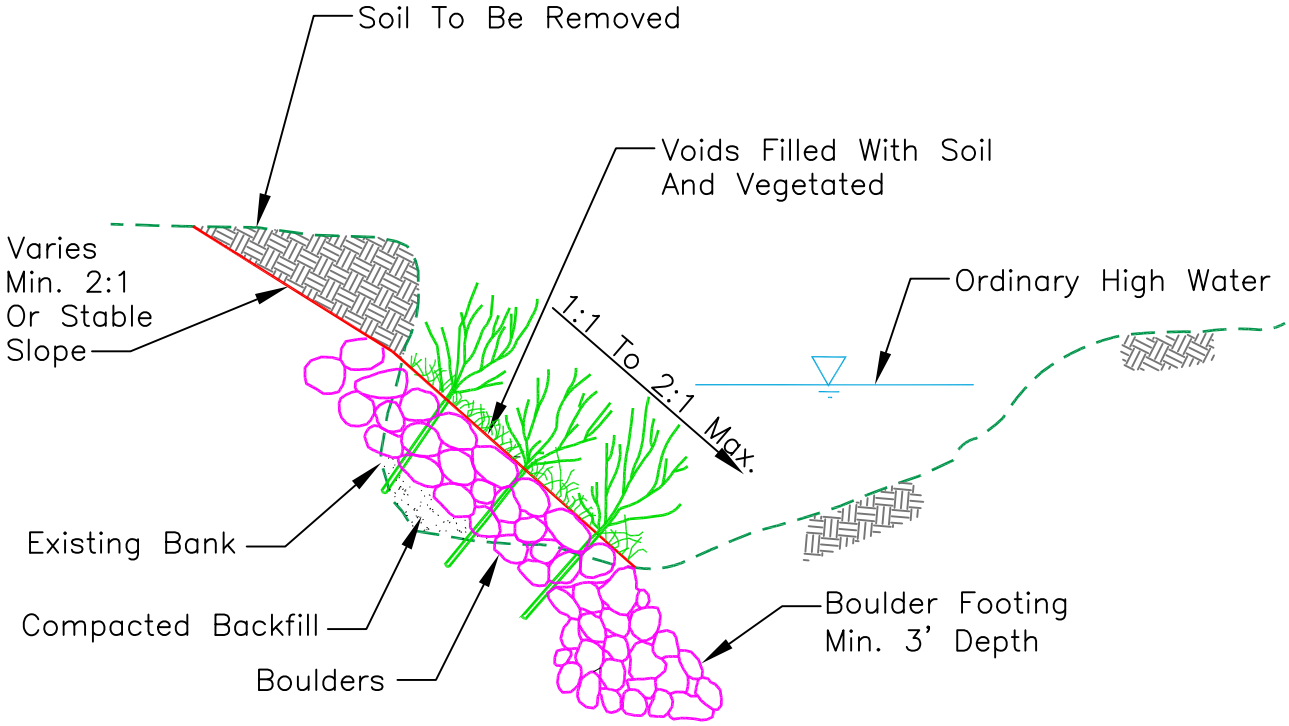
[2]Source: Adapted from Natural Resources Conservation Service. Stream Corridor Restoration Principles, Processes and Practices

Bank Stabilization Measures

#8B: Boulder Revetment with Soil and Vegetation



Source: Natural Resources Conservation Service, Stream Corridor Restoration Principles, Processes and Practices



#9: Articulated Concrete Blocks

Description:

Articulated concrete blocks (ACB) consists of concrete interlocking blocks that are cabled together to form mats that can be laid on the channel slope and/or channel bottom. The ACB is extended below the invert to form a cutoff wall.

ACBs are available in two styles: open cell and closed cell. The open cell style allows for vegetation to be recruited into the soil filing of the cell. Vegetation growth is restricted by the sizes of the cell openings and by the disconnection caused by the cell walls.

Design Criteria:

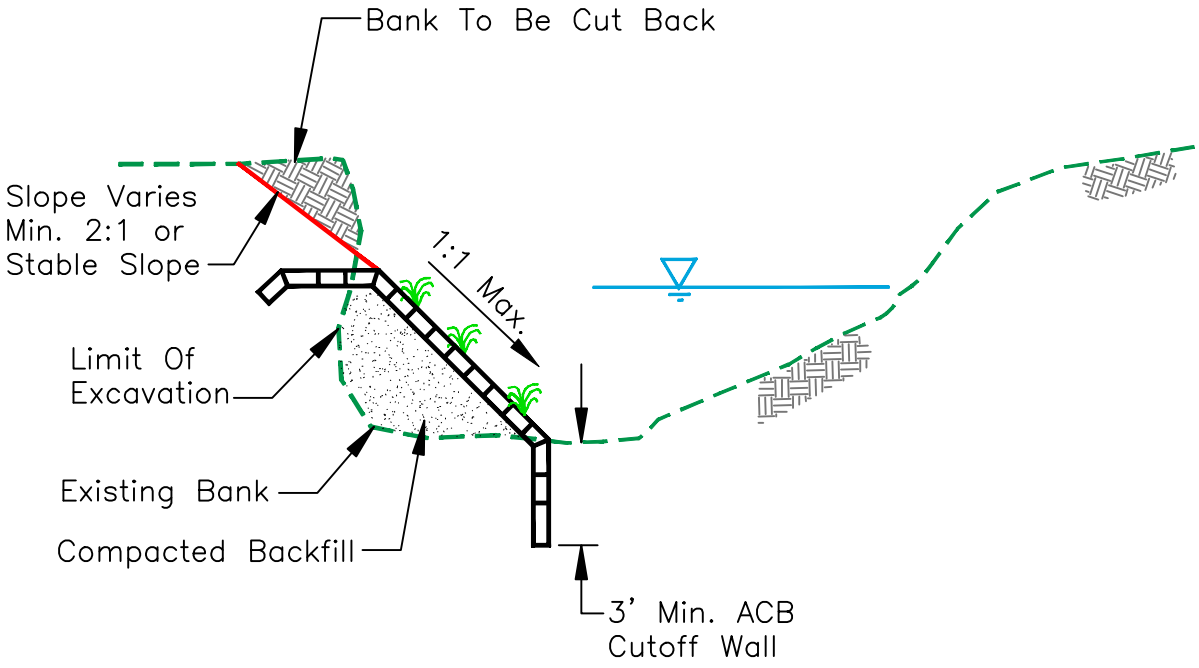
Appropriate for slopes up to 1 to 1.

Appropriate for velocities up to 15 feet per second for closed cell ACBs, 6 feet per second for open cell ACBs.

Habitat Impact Assessment:

In-Stream: Provides limited biotic resources
Stream-side: Reduces or eliminates biotic potential

Bank Stabilization Measures
#9: Articulated Concrete Blocks



SECTION

#9A: Articulated Concrete Blocks with Planting Areas

Description:

Articulated concrete blocks (ACB) consists of concrete interlocking blocks that are cabled together to form mats that can be laid on the channel slope and/or channel bottom. The ACB is extended below the invert as a cutoff wall to prevent undermining of slope protection.

ACBs are available in two styles: open cell and closed cell. The open cell style allows for vegetation to be recruited into the soil filing of the cell. Vegetation growth is restricted by the sizes of the cell openings and by the disconnection caused by the cell walls.

Open planting areas can be constructed into the ACB mats by creating an opening in the mat by removing some of the blocks. The open areas can be revegetated with shrubs and trees. Irrigation is provided to the planted vegetation to aid plant establishment.

Design Criteria:

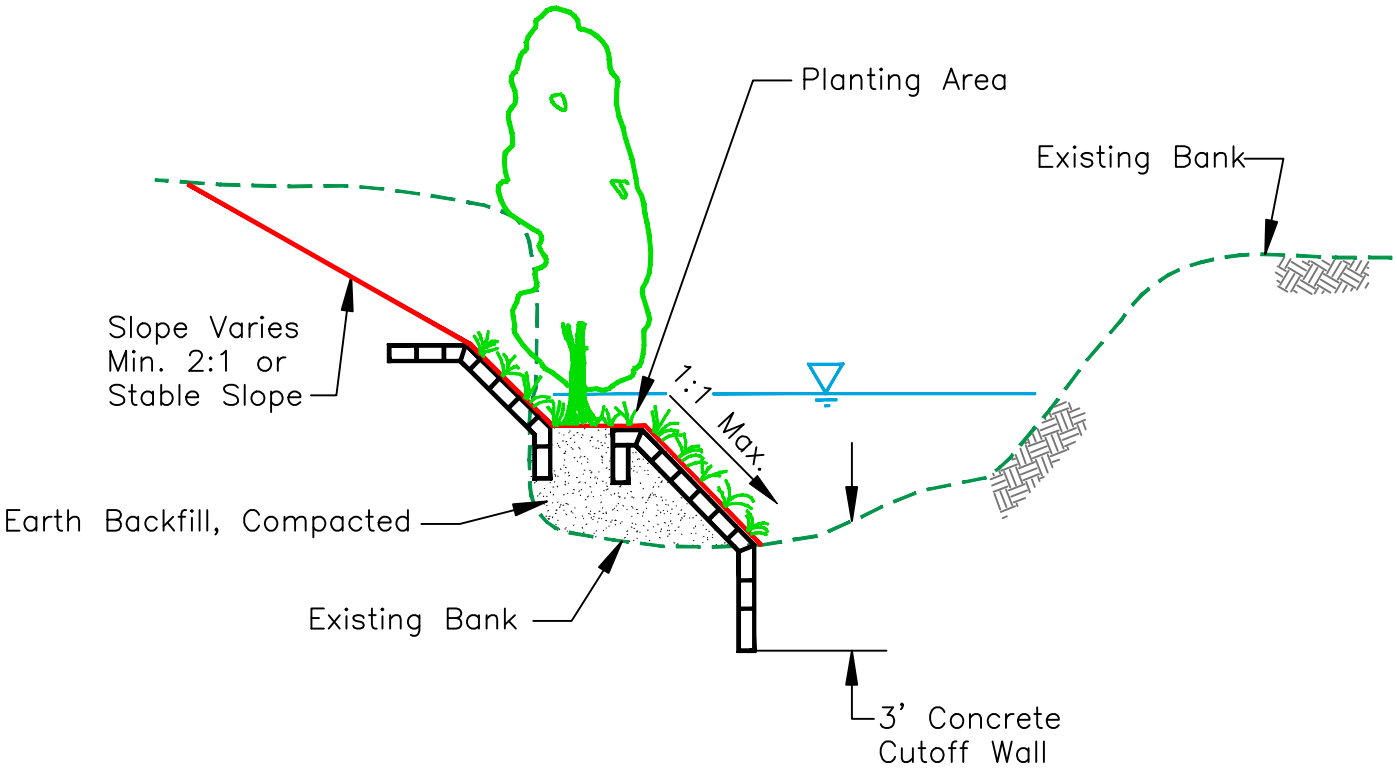
Appropriate for slopes up to 1 to 1.

Appropriate for velocities up to 15 feet per second for closed cell ACBs, 6 feet per second for open cell ACBs.

Habitat Impact Assessment:

In-Stream:	Provides limited biotic resources
Stream-side:	Reduces or eliminates biotic potential

Bank Stabilization Measures
#9A: Articulated Concrete Blocks with Planting Areas



SECTION

#10: Concrete Crib Walls

Description:

Concrete crib walls consist of stacked interlocking concrete frames that form a retaining wall. The structural strength is developed by the composite design of a concrete frame with compacted backfill. Crib walls are constructed with open face panels that are planted by live staking. This method restricts plant growth by the size of the panel opening. As the crib wall slope is flattened and the lattice becomes more open, the vegetation potential increases and the allowable velocity decreases because of the exposed soil and vegetation.

Design Criteria:

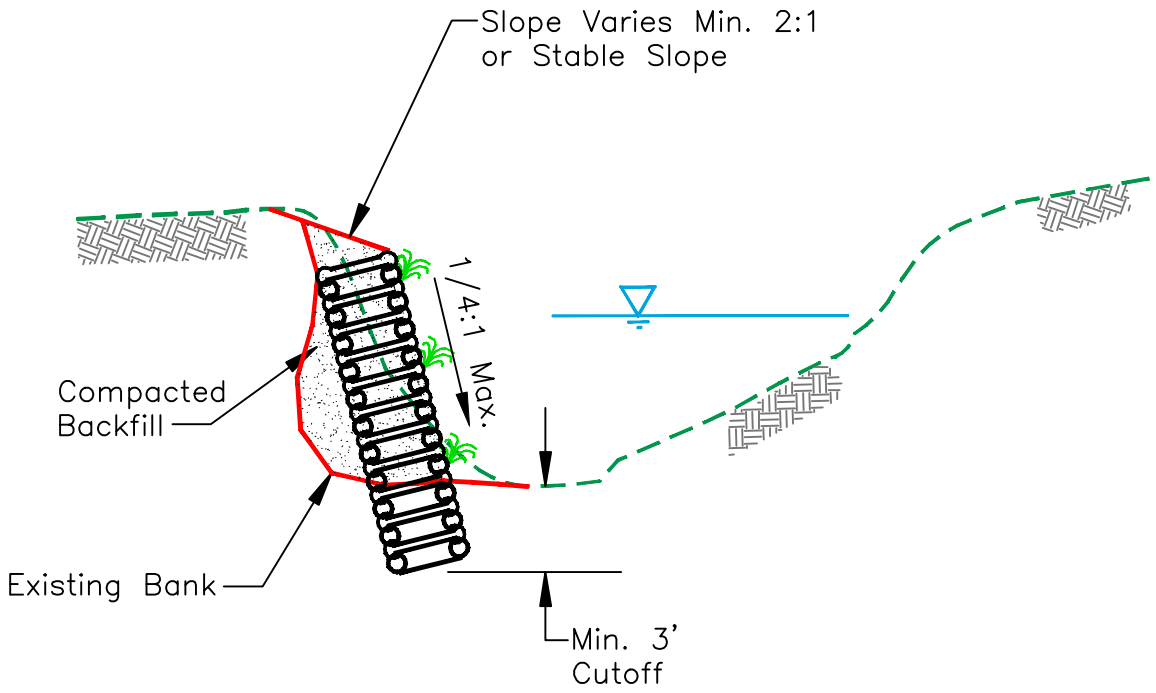
Appropriate for slopes up to ¼ to 1.

Appropriate for velocities from 6 feet per second up to 15 feet per second, depending on the size of the crib wall's openings.

Habitat Impact Assessment:

In-Stream: Reduces or eliminates biotic potential
Stream-side: Reduces or eliminates biotic potential

Bank Stabilization Measures
#10: Concrete Crib Walls



SECTION

#11: Sacked Concrete

Description:

Sacked concrete slope protection (SCSP) consists of burlap bags filled with concrete and placed against channel banks. SCSP requires a three-foot deep concrete or SCSP cutoff wall at the toe of the slope to prevent failure. SCSP does not provide any revegetation potential. However, it offers the opportunity to contour walls such that impacts to existing vegetation are avoided

Design Criteria:

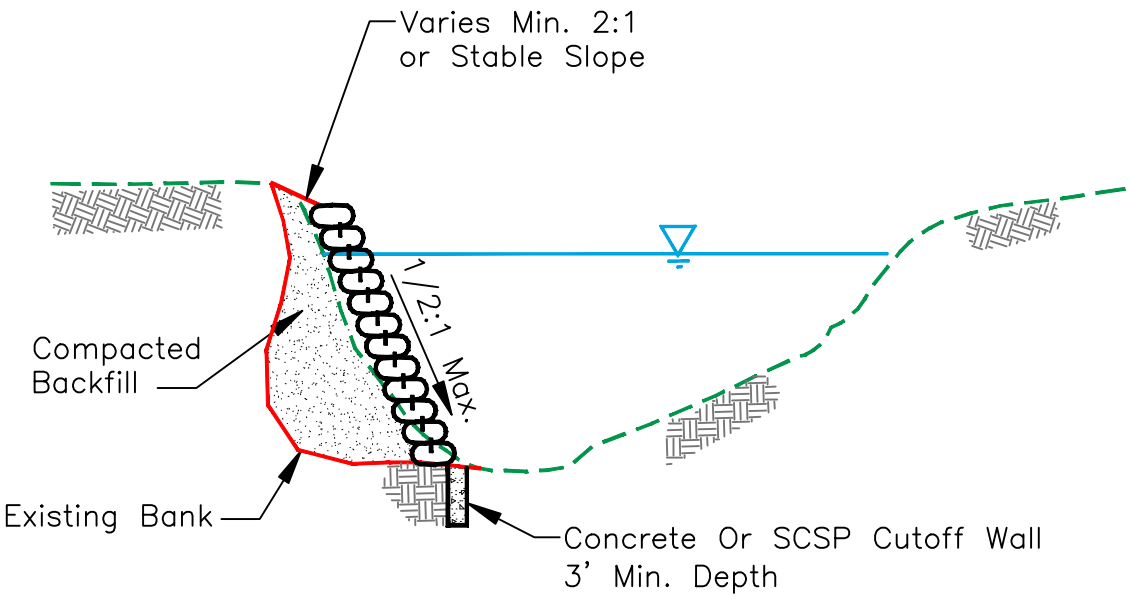
Appropriate for slopes up to ½ to 1.

Appropriate for velocities up to 15 feet per second.

Habitat Impact Assessment:

In-Stream:	Reduces or eliminates biotic potential
Stream-side:	Reduces or eliminates biotic potential

Bank Stabilization Measures
#11: Sacked Concrete



SECTION

#12: Gunite Slope Protection

Description:

Gunite slope protection consists of a concrete mixture sprayed under pressure oven an eroded bank. Reinforcing steel may be placed against the bank prior to spraying.

Design Criteria:

Appropriate for slopes up to vertical.

Appropriate for velocities up to 15 feet per second.

Habitat Impact Assessment:

In-Stream:	Reduces or eliminates biotic potential
Stream-side:	Reduces or eliminates biotic potential

Bank Stabilization Measures

#12: Gunite Slope Protection

(No drawing included for this bank stabilization measure;
please refer to narrative for more information)

#13: Earth with Rock Toe on Grass Lined Channels

Description:

Earth repair with rock toe on grass-lined channels* involves the repair of eroded channel banks using appropriately-sized boulders and compacted soil. Boulders are placed at the toe of the bank up to the ordinary high water elevation. Above this, earth is placed and compacted in successive lifts. The overbuilt embankment is then cut and trimmed back to match the upstream and downstream channel side slopes and toes. The surface is seeded with fast sprouting grass species like rye. Geotextile/erosion control fabric may be placed over hydroseeding to secure newly compacted bank.

* Grass-lined channels are those where grass is the predominant or sole vegetation, and that contain no significant riparian structure.

Habitat Impact Assessment:

In-Stream: Enhances biotic resources
Stream-side: Enhances biotic resources

#13: Earth with Rock Toe on Grass Lined Channels

(No drawing included for this bank stabilization measure;
please refer to narrative for more information)

ATTACHMENT B

Mitigation Feasibility Assessment (MFA)

Mitigation Feasibility Assessment Field Protocol

1. Introduction

Revegetation and riparian planting is one of five methods of mitigation. Experienced staff with recognized botanical and/or horticultural expertise should be consulted early in the project planning phase. Incorporating revegetation and riparian planting direction early into the planning phase will enable staff to identify critical elements or pre-existing conditions at each site. Assessing the project site for revegetation and planting mitigation feasibility will provide direction in determining:

a) Bank stabilization design,
b) Root zone protection measures: construction fencing, plywood/mulch, best access route,
c) Composition of a plant palette suitable to the site if planting is possible,
d) Feasibility of on-site mitigation by standard revegetation methods, and
e) Selection of an alternate mitigation strategy (off-site, invasive species control, revegetation by seeding and/or weed control).

2. Attributes

The feasibility of mitigation depends on the opportunities and constraints of each bank repair site. These elements should be identified as part of the planning process, prior to bank repair design and regulatory agency review. The success criteria for mitigation should be evaluated and adjusted based on these findings. Each site will be analyzed with the criteria elements described below:

a) Hydrology – the proximity of the mitigation site to high-water events and the availability of water to mitigation plantings will directly impact the success of the mitigation site.
b) Velocity – location of plantings in relation to hydraulic characteristics. As an example, the inside of an oxbow or curve may receive velocities that cannot sustain vegetation.
c) Soils – soil type, nutrient content, friability, historic land use, and degree of compaction.
d) Type of repair – may directly relate to the site's ability to grow and support native plants. The type of bank repair may also limit the space available for mitigation, thereby requiring an off-site mitigation alternative.
e) Aspect – duration of sun/shade on site and influence of existing tree canopy. This will influence mitigation species palette.
f) Slope – directly relates to accessibility of site by staff, irrigation needs, and associated maintenance costs.
g) Adjacent land use – run-off from adjacent properties, proximity to trails, impacts from trash/vandalism, and fire hazards.
h) Access to site – tree removals/pruning/root zone protection, impacts to understory vegetation, and accessibility of site by staff to maintain mitigation site. .
i) Presence of invasive plants or animals that are destructive to developing habitat – the long-term success of each site may be adversely impacted by the encroachment of invasive plants and animals into the site. The presence of native herbivores may also require additional protective measures to be incorporated into the mitigation strategy.
j) Presence of rare/listed species – may limit the maintenance activities allowed at the site.
k) Maintenance needs – should be incorporated into the revegetation design for each site. Assess future maintenance needs and determine access requirements, capacity needs, frequency site will need to be re-visited, etc.

3. MFA Ranking

The MFA will result in a revegetation potential divided into three separate rankings: high, medium, and low. Each of these rankings is based on the presence or absence of specific attributes (opportunities and constraints) assessed for the site. These attributes can be further grouped into:

- Physical constraints: required engineering, soil compaction, elevation and distance from the stream, shade/sun availability, etc.;
- Horticultural constraints: soil characteristics, availability of water; shading;
- Cultural/biological constraints: public access/vandalism, rodent activity, wildlife browse, invasive plant species; and
- Maintenance constraints: routine maintenance activities of the creek and flood protection infrastructure – such as access.

All attributes may not be applicable to every project site. Only those applicable attributes will be assessed to determine an appropriate MFA ranking.

MFA Ranking

a) **High** revegetation potential sites have few constraints and no insurmountable constraints with reasonable inputs.

b) **Medium** revegetation potential sites have a few constraints but no insurmountable constraints with reasonable inputs.

c) **Low** revegetation potential sites have several constraints and have constraints that cannot be overcome with reasonable inputs.

Revegetation Planting Potential

Ranking	**High**	**Medium**	**Low**
Site Attribute			
Soils	Soil texture and chemistry suitable to horticultural processes with little or no intervention.	Soil texture and chemistry require some intervention but will support establishment and long term plant processes. **(5)**	Soil texture or chemistry have significant obstacles to horticultural processes. Competing goals (levee compaction for instance) preclude modification. **(10)**
Slope	Slope stable and grade suitable for planting and worker safety during plant establishment.	Slope creates difficulty in plant installation and maintenance (1.5: or greater). Planting and maintenance requires special infrastructure. **(5)**	Severe and/or unstable slope that limits or precludes planting. Worker safety (slope requires roping in, unstable slope above planting, etc.)

			constraints. **(8)**
Hydrology	Water on or immediately adjacent to site, soil allows good capillary action, return flows allow frequent inundation. No need to modify to create good hydrology.	Site and soils have some limitations regarding water availability. Substrate suitable to root expansion. Site may be modified to facilitate water connectivity. **(5)**	Little to no water holding capacity. Site goes dry during hottest part of the year. Little or no ability to improve hydrology through site manipulation. **(10)**
Stream Velocity	Low velocity flows that will not impact plant establishment or mature plantings.	Infrequent velocities sufficient to undermine or wash out vegetation. **(5)**	Frequent or constant velocities likely to undermine or wash out vegetation. **(8)**
Solar Aspect/Shade	Open area without harsh sun exposure.	Harsh solar aspect or heavy shade that could impact plant establishment. Reasonable inputs can offset limitations. **(5)**	Heavy shade or solar aspect, coupled with other factors, create significant probability of plant failure. No reasonable remedies to overcome site condition. **(10)**
Repair Characteristics	Repair has planting attributes designed into the project. Design requirements are not incompatible with plant establishment.	Repair has some features that are incompatible with plant establishment. Reasonable inputs or design modifications increase survival potential. **(5)**	Design requirements are incompatible with planting. Little or no accommodation can be made to increase plantability. **(10)**
Adjacent Land Use	No land use issues incompatible with mitigation goals.	Some level of land use or human activity incompatible with habitat goals (trespass, homeless habitation, dumping, illegal recreational uses, etc). Level may be reduced or eliminated with minimal intervention. **(5)**	Excessive or chronic human activity that is incompatible with habitat goals. Heavy homeless habitation, historic dumping, or other evidence of persistent unauthorized activity. Ability to change conditions unlikely or impossible. **(10)**
Access to Site	Little or no access restrictions for staff and equipment.	Some access requirements that preclude vehicular access and or make pedestrian access difficult. Site may be accessed for establishement maintenance with	Significant obstacles to access by vehicles and pedestrians. Site may be landlocked (no easement), require extensive hiking or water crossings. Topography may preclude equipment

		reasonable accommodations.**(5)**	access. **(10)**
Invasive Species/Rodents, Browse	Little or no evidence of invasive plant species or heavy rodent activity	Invasive plants on and/or encroaching into site. Current or recent evidence of heavy rodent populations (Pocket Gopher, CA Ground Squirrel. Issues and to be resolved or reduced to acceptable threshold at time of construction. **(5)**	Heavy infestation of invasive plant species (Arundo, Cape Ivy, Broom, Blue Gum Eucalyptus, etc.). Established active rodent population on and adjacent to site. Surrounding conditions suggest ongoing difficulty in controlling negative impacts (re-infestation from adjacent areas). **(10)**
ESA Limitations (Endangered Species Act)	No management limitatations based on presence of listed species. Potential benefit to listed species due to creation of habitat.	Presence of listed species requires alteration some of maintenance practices. Examples would be some pesticide prohibitions, delays in scheduled maintenance, limitations on vehicular access. **(5)**	Presence of listed species requires significant alteration of maintenance practices. Examples would be on-site biological monitor, complete pesticide ban, major calendar exclusions of maintenance activities. **(8)**
Facility Maintenance	Little or no change in site management based on required facility maintenance.	Some change to mitigation required due to required facility needs. Examples such as reduced planting due to ongoing prescribed maintenance, setback of vegetation to meet fire codes, elimination of tree species to maintain capacity. **(5)**	Significant compromises in habitat design to accommodate facility needs. Examples would be Corps inspection setbacks, elimination of woody species to reduce roughness, loss of planting area for equipment access. **(8)**

4. Revegetation Potential Scoring

   a) A “High” rating contributes a “zero” score. The lower the score, the feasibility for replanting is higher; the site is better.

   b) Each “Medium” or “Low” rating of an attribute would be scored as outlined in the above table. The individual points attached to each attribute are based on its potential to impede mitigation success and the degree of difficulty involved in overcoming the obstacle.

c) The total points would be deducted from the most stringent success criteria, and would result in an adjusted success criteria commitment; more appropriate to the specific site conditions.

d) The lowest score that a site could receive would be 40. If a site scores more than 40 using the prescribed formula, it would be considered unsuitable for revegetation and an alternative site or mitigation obligation would be proposed.

e) Some sites might have an extraordinary condition where one specific attribute could be scored higher than is listed in the table, whereby its function at that site is critical for the success of the site. In that case, even if the overall scoring would seem possible, if one (a few) attribute(s) makes a site undesirable to plant, an alternative success criteria could be negotiated separate from the scoring formula proposed in the table.

5. Mitigation Accounting

a) The maximum success criteria is 75% total cover of native vegetation in 5 years, with a 70% survival rate. Trees may be replanted at any time, for loss of individuals. The lowest success criteria is 35% total cover of native vegetation in 5 years.

b) A site receiving a “perfect score” defined as a “High” in every category would commit to a maximum of 75% total cover of native vegetation in 5 years from the time of installation. Some replanting of lost individuals may occur during this time.

c) The sum of all attribute scores are subtracted from the maximum success criteria percentage.

Example: A site receives a total score of 20. The maximum success criteria is 75%. Therefore, 75-20 = 55%. This is the new success criteria of total native cover after 5 years.

d) The lowest score that a site could receive would be 40, resulting in a success criteria cover commitment of 35% total native cover after 5 years. If a site scores more than 40 using the prescribed formula, it would be considered unsuitable for revegetation and an alternative site or mitigation obligation would be proposed.

ATTACHMENT C

Tree Scoring for Removal of Trees and Shrubs 6-≤12” dbh

Tree Scoring for Removal of Trees and Shrubs 6 -≤ 12" dbh

Trees and shrubs 6~~up~~ to 12" dbh may be removed under the Stream Maintenance Program 2012-2022. The sum value from the assessment of four (4) attributes will provide a mitigation ratio for the trees/shrubs proposed for removal. Trees >12" dbh are not included as a part of this removal program. High scores equate to higher value trees, with greater potential impacts if they are removed; and therefore, will require more mitigation. Low scores equate to lower value trees, having fewer potential impacts if they are removed; and therefore, require lower mitigation.

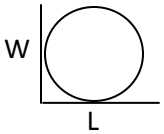
Multi-stem: A tree or shrub with a root ball and multiple trunks or stems. This may occur at ground level or several feet above ground. The dbh of trees with multiple stems will be calculated by adding the diameters of the individual stems at 4.5 feet above ground. Individuals with greater than seven (7) stems at dbh will be assessed by their canopy cover.

A. Approach

Tree replacement would start with a baseline ratio of 1:1. Replacement ratios would increase or decrease based on specific ecological attributes of the individual(s) to be removed and the setting in which it is/they are located. Scoring would add to or subtract from the baseline ratio. Final ratios would be calculated using the methodology outlined below. Due to the habitat value of native oaks and sycamores, these species will be replaced in-kind, with like native species.

B. Ranking

1. Canopy cover
   a) Square footage of canopy is measured at the widest drip-line extension of the subject tree.
   b) Grouping or stands of trees are calculated as the summation of each individual tree canopy, even if the canopies overlap. Open space between the trees would not be factored into the square footage calculation.
   c) Calculations may be made on approximations (+/- 5 feet) with areas converted to measurable geometry. Width x length = square footage. (Estimating by a triangle or circle is also acceptable.)
   d) 0-100 sq. ft. is ranked 0 as the baseline from which mitigation starts is 1:1



Metric: Choose 1. Assess at widest dripline extension point ~~and square that value~~.

Attribute	**Score**
0-100 Square Feet of Canopy (< 10' diameter)	0 points
101-400 Square Feet of Canopy (10 - 20' diameter)	+ 1 points
>401 Square Feet (> 20' diameter)	+ 2 points

0-2 points

2. Local Area Value
   a) Is the affected vegetation unique to its geographic location based on a measurable attribute (species, size, structure, absence of adjacent comparable vegetation).
   b) There is a 2000 sq ft maximum for removal of a stand of trees.

Metric: Choose all that apply. Score = 0 if none of these apply.

Attribute	**Score**
Native Species	+1 point
No similar vegetation within 500 feet radius (Size of canopy, height, or similar measurable criteria; even if non-native).	+1 point
Stand Reduction (Removal of target trees would reduce stand by more than…)	+1 point for 20-50% reduction +2 points for greater than 50% reduction

0-4 points

3. Ecosystem Benefits (wildlife, fisheries, streams)
    a) Tree used by wildlife. Examples include: cavity nesting, nectar feeders, high wildlife food value (seeds, fruits, flowers), cavities and crevices for bats, dead wood for woodpeckers and insect feeders, perching, roosting, nesting, etc. This will rarely ever be zero.
    Supports macroinvertebrate and biomass decomposition processes.
    b) Provides structure/cover : Nurse tree, horizontal or vertical cover.
    c) Provides SRA: Shaded Riverine Aquatic, $\leq$ 15 ft from the water's edge or overhangs water, shade, roots or branches in water providing habitat for fish and aquatic organisms, could contribute instream woody debris.
    d) Tree is 6-12" dbh, provides more mature structure and life form to the surrounding environment.

Metric: Choose all that apply.

Attribute	**Score**
Used by wildlife	+ 1 point
Structure/Cover (vertical, horizontal)	+ 1 point
SRA	+ 1 point
Tree is 6-12" dbh (life form)	+ 1 point

1-**4 points**

4. Ecosystem Detriments

    a) Tree has ecologically undesirable attributes.
    b) Ecological arboriculture would include a tree failing to thrive with little or no hope of recovery. Note: this distinguishes between tree removals that may benefit the ecological setting versus hazard trees.

Metric: Choose all that apply. Score = 0 if none of these apply.

Attribute	**Score**
Significant structural defects	-1 point
Non-native species OR Invasive species	-1 point OR -2 points
Removal for ecological arboricultural reasons (diseased, infestation), excludes hazard trees	-1 point

-4-0 points

C. Mitigation Calculation

Baseline is 1:1 ratio for trees impacted in this size class.
Point reductions could result in a final score that reduces the ratio to less than 1:1.
Due to the habitat value of native oaks and sycamores, these species will be replaced in-kind, with like native species.

Attributes	Min.	Max.
Vegetation Cover	0	2
Local Area Value	0	4
Ecosystems Benefits	1	4
Ecosystems Detriments	-4	0
Total Range	**-3**	**10**

Attribute Range	Mitigation Ratio
-3 - 2	1:1
3 - 5	2:1
6 - 10	3:1

Tree Scoring for Removal of Trees and Shrubs 6 -≤ 12" dbh

Site Location_____ Species_____
Assessors Name_____ DBH_____
Date_____ Canopy Cover sq ft_____
ESU #_____ Reason for Removal_____

1. Canopy cover

Metric: Choose 1. Assess at widest dripline extension point.

Attribute	Score
0-100 Square Feet of canopy cover (< 10' diameter)	0 points
101-400 Square Feet of canopy cover (10-20' diameter)	+ 1 points
>401 Square Feet (> 20' diameter)	+ 2 points

0-2

Vegetation Cover
Score:_____

Stand maximum = 2000 sq ft

2. Local Area Value

Metric: Choose all that apply. Score = 0 if none of these apply.

Attribute	Score
Native Species	+1 point
No similar vegetation within 500 feet radius (Size of canopy, height, or similar measurable criteria; even if non-native).	+1 point
Stand Reduction (Removal of target trees would reduce stand by more than:.....)	+1 point for 20-50% reduction +2 points for greater than 50% reduction

0-4

Local Area Value
Score:_____

3. Ecosystem Benefits (wildlife, fisheries, streams)

Metric: Choose all that apply.

Attribute	Score
Used by wildlife	+ 1 point
Structure/Cover (vertical, horizontal)	+ 1 point
SRA	+ 1 point
Tree is 6-12" dbh (life form)	+ 1 point

1-**4**

Ecosystem Benefit
Score:_____

4. Ecosystem Detriments

Metric: Choose all rows that apply. Score = 0 if none of these apply.

Attribute	Score
Significant structural defects	-1 point
Non-native species or Invasive species	-1 point or -2 points
Removal for ecological arboricultural reasons (diseased, infestation) excludes Hazard trees	-1 point

-4 – **0**

Ecosystem Detriment
Score:_____

C. Mitigation Calculation

Due to the habitat value of native oaks and sycamores, these species will be replaced in-kind, with like native species.

Attributes	min	max
Vegetation Cover	0	2
Local Area Value	0	4
Ecosystems Benefits	1	4
Ecosystems Detriments	-4	0
Total Range	**-3**	**10**

Total 4 Attributes
Score:_____

Attribute Range	Mitigation Ratio
-3 - 2	1:1
3 - 5	2:1
6 - 10	3:1

Mitigation Ratio:_____

Canopy Cover sq ft **X** Ratio quotient = Amount Owed

_____

ATTACHMENT D

Invasive Plant Management Plan

2012-2022 SMP Mitigation

Invasive Plant Management ~~Program~~Plan

1.0 ~~PROGRAM~~ PLAN OVERVIEW

Controlling the spread of invasive plant species is a critical element in improving the ecological health of our streams and watersheds. Invasive plants tend to thrive and spread aggressively, negatively altering resource allocation regimes, wildlife patterns, soil stability and water quality thus degrading habitat quality and the overall ecological value of a site. In addition, invasive plants can exacerbate flooding and fire danger, undermine structural assets, and obstruct access to roads, levees and trails.

The Invasive Plant Management Program (IPMP) will serve as compensatory mitigation for SMP (Stream Maintenance Program) vegetation impacts to upland, riparian, freshwater and tidal wetlands by eliminating or significantly controlling the population of invasive plant species from these affected habitats. The IPMP will be a two-pronged approach including: 1) a systematic program to control priority invasive plants throughout Santa Clara County; and 2) an opportunistic program to manage invasive plants within active individual SMP work sites. These two approaches will dovetail together to enhance the overall ecological health of our creeks and watersheds.

The IPMP may be implemented in any location within the coverage area of the SMP. Priority, however, will be given to conducting control work in locations that contain sensitive habitats, sensitive species and/or provide quality habitat for a variety of wildlife. When possible, the District will coordinate with adjacent landowners to try and accomplish a complementary and consistent approach to invasive plant management.

2.0 ~~PROGRAM~~ PLAN GOALS AND MITIGATION COMMITMENTS

The overall goal of the IPMP is to preserve and improve habitat within Santa Clara County streams and riparian corridors through removal of invasive plants. This will be achieved through early detection and systematic removal of invasive plants in existing high quality habitats, opportunistic removal of invasive plants in SMP work locations, as well as undertaking control efforts in currently degraded habitats to improve the overall ecological site condition.

A. Over the course of the 10 year permit, the systematic portion of the IPMP will target: 1) removal of

priority invasive plants in existing high quality habitats and 2) control efforts in currently degraded habitats to improve overall ecological site conditions. Mitigation needs and credit will be determined annually, dependent on the proposed work for the year and the associated impacts expected to be incurred in each habitat type, i.e., upland, riparian, freshwater and tidal wetland impacts. A proposal for mitigation credit and the associated acreage to be treated for this program will be submitted with the "Notice of Proposed Work".

B. The opportunistic portion of the IPMP will target removal of invasive plants at specific SMP work sites. This effort will be variable each year dependent on the number of project sites where invasive plant removal is feasible. Mitigation credit accrued will be used to compensate for on-site vegetation impacts or for ongoing vegetation maintenance activities. Proposed mitigation credit for each project site will be submitted with the annual "Notice of Proposed Work."

The IPMP plans to coordinate and collaborate with other regional control and early detection programs in order to stay apprised of regional issues (e.g., Bay Area Early Detection Network (BAEDN), California Invasive Plant Council (CAL-IPC), San Francisco Estuary Invasive Spartina Program (ISP), Arundo Del Norte, etc.). Coordination will also take place with other landowners in Santa Clara County to try and accomplish a complementary and consistent approach to invasive plant management throughout the County (ex., Don Edwards National Wildlife Refuge, Cities of Palo Alto, Mountain View and San Jose, etc.).

3.0 ~~PROGRAM~~PLAN IMPLEMENTATION

A. Systematic Component

A priority matrix of invasive plant species has been developed which integrates and weights a variety of factors including: the 2006 CAL-IPC ratings, the anticipated rate of spread without management intervention, the feasibility of effective control, impacts to fish and wildlife, impacts to sensitive plant communities, increases in flood or fire danger, and aggressive growth patterns known to cause structural damage to flood control facilities or impede maintenance access (Table 1).

California Department of Food and Agriculture (CDFA), CAL-IPC, and BAEDN invasive plant databases will be consulted periodically to ensure the District's priority matrix is up to date. The matrix will also be reviewed and updated to tailor the list to specific occurrence data in Santa Clara County and establish the priority targets for the year.

Specific locations targeted for control activities will be selected based on the baseline inventory (See Section 4 below) as well as a variety of other factors including: quality of habitat, feasibility of control, access constraints, etc. Integrated Vegetation Management techniques will be employed (ex., mechanical, chemical, combination, etc.) to utilize the most effective method for each species while providing the greatest amount of protection to environmental resources.

Success criteria will be developed for each site, and/or for each individual target species. Eradication will be the ultimate goal for defined sites where conditions exist to make it a realistic goal. Exclusion or containment strategies may be used where an invasive poses a threat to a sensitive species or habitat type and complete eradication is deemed infeasible. These control strategies may also be used to suppress highly competitive invasive species and give existing native species the ability to thrive.

Control work for certain species may require several years of treatment to be effective. Repeat invasive plant management mitigation activities, within a two-year period will be accounted toward the original mitigation requirement. For infestations that require more than two years of treatment, the work on the site in year three and following will become available to be counted as mitigation for new SMP maintenance activities (at a 50% rate for the patch area).

Efforts will be made to encourage natural revegetation/recruitment at treatment sites, including suppression of other weed species. In areas where revegetation does not occur naturally within 2 years, a biological/horticultural assessment will be made to determine what impediments may exist to natural revegetation. In areas where revegetation potential exists, a plan will be developed to install site-appropriate vegetation. Mitigation credits for revegetation may be applied, consistent with SMP 2012 mitigation accounting.

Once the annual mitigation needs are determined, a proposal for mitigation credit and the associated acreage to be treated for this program will be submitted with the “Notice of Proposed Work”. IPMP may be combined with other forms of mitigation such as revegetation or land acquisition to encourage a holistic mitigation program that is sustainable in the long term.

B. Opportunistic Component

Invasive plant species are frequently found during field inspections and are often associated with other identified SMP work activities (i.e., bank repair sites, sediment removal sites, minor maintenance sites, etc.). In these instances, opportunistic control of invasive plants may enhance habitat quality and benefit the ecological landscape.

There is no specific target acreage for the opportunistic component of the Program. Credit for these removals will be on a case by case/ site by site basis. Mitigation credit gained through this portion of the program will be used to defray for on-site vegetation impacts or to compensate for ongoing vegetation maintenance activities. Proposed mitigation credit for each project site will be submitted with the annual "Notice of Proposed Work."

C. Coordination & Education

The District will coordinate and collaborate with other regional control and early detection programs in order to stay apprised of regional issues (e.g., BAEDN, CAL-IPC, ISP, Arundo Del Norte, etc.). The IPMP will document invasive species occurrence and control data and submit pertinent information to regional databases (e.g., CAL-IPC, Cal Flora, and BAEDN).

Coordination will also take place with other landowners in Santa Clara County to try and accomplish a complementary and consistent approach to invasive plant management throughout the County (ex., Don Edwards National Wildlife Refuge, Cities of Palo Alto, Mountain View and San Jose, etc.).

An informational brochure highlighting priority invasive species will be published which includes pictures, provides descriptions, and discusses the threats posed by each plant to help educate District field staff and the public about these species. Increased awareness will aid with early detection and/or identification of previously unidentified locations of these species. In addition, during control activities, informational postings will be placed at publicly accessible sites.

4.0 MONITORING

A. Baseline Inventory and Database Development

The county-wide vegetation mapping conducted in 2010 by Aerial Information Systems, Inc. (AIS) for the SMP will be used to develop a baseline inventory of invasive species in the SMP footprint. This data layer will be supplemented with pertinent information collected by District staff and regional databases (e.g., CAL-IPC, Cal Flora, etc.) to establish the Year 1 baseline inventory.

The inventory will be updated annually based on field inspection data collected by Vegetation Management staff, biologists, and Field Operations Administrators. Over the life of the program, important information will be collected regarding the distribution of invasive species in Santa Clara County watersheds, their overall ecological impact, the

efficacy of management efforts, and the best direction for future management to reduce the negative ecological impacts of invasive plants.

B. Treatment Monitoring

Treatment areas will be mapped with a GPS and tracked for long-term success at all programmatic and opportunistic control sites. This will help determine the efficacy of the particular treatment and determine if additional control work and/or a different technique will be necessary. Results of the treatment monitoring will be critical for prioritizing follow-up treatments and planning seasonal work.

5.0 REPORTING

A proposal for mitigation credit will be submitted annually with the "Notice of Proposed Work." This proposal will discuss the mitigation details of both the systematic and opportunistic components of the IPMP. Acreage of target species to be controlled as well as general locations of control activities will be discussed.

Annual summary reports will be submitted to the regulatory agencies providing details regarding the species treated, control methods used, and locations of treatment work. Recommendations will be provided, including future management needs and the feasibility of active revegetation, if necessary.

6.0 SCHEDULE

The IPMP will be implemented over the course of the 10 year permit. Specific project milestones include:

- Regional coordination will be ongoing upon initiation of the program.
- Baseline invasive plant inventory will be completed within the first two years of the program.
- Priority matrix of invasive plant species will be updated as needed.
- Proposal for mitigation credit will be submitted annually with the "Notice of Proposed Work"
- Control efforts for the opportunistic component will begin in year 1 of the program.
- Control efforts for the programmatic component will begin in Year 2 after the baseline inventory is complete.
- Mitigation status will be reported annually.

7.0 ~~PROGRAM~~PLAN ADMINISTRATION

This program has been constructed for the sole purpose of meeting the mitigation requirements of the SMP.

As a mitigation element of the SMP, the IPMP is defined as a separate work category. While it has elements of vegetation management, revegetation and maintenance it is not subject to the limitations defined for these separate work activities. Since the IPMP is a mitigation element, the IPMP will have a higher level of biological oversight and resource protection than other "impact" program components.

ATTACHMENT E

Large Woody Debris

Management of Large Woody Debris in Santa Clara County Streams

Guidelines for Implementation

Stream Maintenance Program Renewal Project

Prepared by Watershed Management Division

Melissa Moore

February 9, 2010

DRAFT

Management of Large Woody Debris in Santa Clara County Streams

Guidelines for Implementation

Objective

Retain woody debris in streams throughout Santa Clara County in order to preserve the physical and biological processes associated with the natural recruitment of wood to waterways. This is the process of altering urban streams so that their behavior corresponds as closely as possible with that of natural streams while providing some measure of flood protection (Keller and Hoffman, 1977).

Location, Size and Description of Large Woody Debris

These guidelines pertain to the instream area which is defined as the stream channel within ~~bankfull~~ ordinary high water discharge demarcations. The term ~~'bankfull'~~ ordinary high water is defined by the Army Corps of Engineers (ACOE) as that line on the shore established by the fluctuations of water and indicated by physical characteristics such as clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas. ~~The term 'bankfull' is defined as the incipient elevation on the bank where flooding begins (Rosgen, 1996).~~ Furthermore, these guidelines will utilize established methods of defining and classifying large woody debris (LWD) as outlined in California Salmonid Stream Habitat Restoration Manual (CDFG, 1998).

During the initial biological survey of the woody debris site, the biologist will be responsible for recording the size and position of the wood in relation to the channel. Large woody debris is defined as having a minimum diameter of 12 inches (30.5 cm) with a minimum length of 6 feet (1.82 meters). The size criterion is divided into four categories based on the position of the woody debris as follows: 1) dead or downed, 2) dead and standing, 3) perched (on the bank and soon to be in the stream channel area) 4) live (either coniferous or deciduous). Management of the area beyond the instream zone, the recruitment zone, which encompasses the floodplain, is not incorporated in these guidelines.

Management Strategy

In order to effectively manage large woody debris in streams within the urban landscape of Santa Clara County, the District will use a four tiered, multi-disciplined approach. Each tier will be described within this document however, minor modifications based on site conditions may occur.

1) Retain LWD in the Channel

Watershed maintenance crews will identify sites in which woody debris is proposed for removal. Each site will be evaluated by a biologist to determine the ecological and geomorphic integrity the wood is

providing to the stream channel. During the biological evaluation the size and position of the wood in relation to the wetted channel should be described. Additionally, a GPS point or GIS coordinates of the wood should be recorded regardless of the fact that the wood may eventually be removed. Watershed engineers may be asked to evaluate the woody debris to determine the potential for bank erosion, channel incision or infrastructure safety. If a consensus is reached to leave the wood in place, the watershed personal may collectively decide if the woody debris will require additional monitoring.

2) Modify Instream LWD

If the LWD cannot be left in its original configuration and position within the wetted channel due to flooding, trash or erosion potential, the wood can be modified and left in place. Modification can include; removal of small, lateral branches which capture debris, changing position of the LWD to avoid excessive bank scour or reconfiguration of the LWD to avoid aggradations or channel incision in select locations. The most important consideration in the decision making process to modify the LWD, is to retain its biological and geomorphic integrity. If that is not a feasible option, watershed staff should consider removal or remove/replace alternatives.

3) Remove LWD and Replace

If the watershed staff decide the wood is an imminent flood risk or infrastructure safety is of great concern, the third tier in the decision making process is to remove the wood from its original location and replace it elsewhere within the watershed. Considerations for the new location of wood placement could be the presence of a floodplain, larger width/depth ratio, greater biological value (i.e. natural channel versus modified), or simply improved access.

4) Remove LWD

If all other avenues of wood management are exhausted, tiers 1-3, watershed staff may decide that the wood requires complete removal from the stream channel. Complete removal may occur in highly modified streams with low or zero tolerance for instream vegetation or structures such as LWD.

Mitigation for LWD

Mitigation for LWD would only be required in creeks that support anadramous fish; though management of LWD is desired in all Santa Clara creeks. As shown in Figure 1. Large Woody Debris Accounting Criteria, only wood that is protruding into the ordinary high water area would need to be calculated for mitigation purposes. This demarcation is used as it is the wood within the ordinary high water area that is able to create habitat within the waterway.

The Mitigation Approach Memorandum, Appendix C FSEIR, describes the mitigation requirements and methods to meet those requirements. Modification of these requirements may be made through the Biological Opinion of the National Marine Fisheries Service.

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Work Window for LWD

LWD management will follow the same work windows as for vegetation management. Modification of these requirements may be made through the Biological Opinion of the National Marine Fisheries Service.

Monitoring LWD

The selection of when and what to monitor will be derived from any concerns that arose during the decision making process (tiers 1-3) to leave the wood in place. For example, if the potential for bank scour was cited as a chance of occurrence, the team may decide to install lateral scour bars into the bank. Painted rebar will be installed laterally into the stream bank at selected locations to determine if local scour occurs due to the presence of the wood in the channel. If excessive aggradations or channel incision is a concern for watershed staff, then scour chains can be installed in appropriate locations.

After a decision is reached to monitor the LWD, the biologist will be responsible for installation of the agreed upon monitoring tools (i.e. lateral scour bars, scour chains) and installation of the tree tag. All LWD that requires monitoring will be fitted with an aluminum tree tag and given a unique identifying number. An important component to monitoring LWD is to determine the flow rate at which the wood will move. If the wood moves from its original location during a storm event, the biologist will survey downstream locations for the LWD and determine the maximum discharge from the closest upstream gauge. This information can be utilized in future decision making processes to leave/remove LWD within a watershed context. Most geomorphic effects of wood in rivers arise from large, stable logs (Montgomery, 2003). Finding the threshold for size and movement will assist the watershed staff in long term management of wood in local urbanized drainages. If the LWD does move from its original location it will have to be reassessed for safety/flooding concerns.

After the watershed staff decides to monitor the wood, a determination on the frequency of the monitoring will occur. Factors to consider when deciding how often the biologist should monitor the LWD can be determined based on location of the LWD within the watershed, presence of a floodplain, water management upstream of LWD structure, the spatial relationship of LWD with urban infrastructure (i.e. bridges), or duration and amount of rainfall.

Database Management

Each request submitted by watershed maintenance staff for biological evaluation of LWD can be tracked in the database management system. The database can track what percentage of wood is left in place within a watershed, what is modified and what is removed. Effectively managing LWD overtime, can improve channel processes which will enhance habitat features as well as reduction of trucking and disposal costs of LWD.

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Summary of Roles and Responsibilities

1) Watershed maintenance staff submits work request for removal of LWD
2) Biologist surveys wood to determine ecological/geomorphic integrity
3) Both maintenance staff and biologist determine if LWD stays in place. If both parties are not in agreement, consultation of a watershed engineer is required. Staff can then determine a course of action based on the four tiered approach.
4) If monitoring is required, the biologist assigned the original evaluation will be in charge of installation of monitoring devices and periodic monitoring.
5) The biologist is responsible for entry of all applicable data into the management system.

Literature Cited

CDFG. California Department of Fish and Game. 1998. California Salmonid Stream Habitat Restoration Manual. State of California Resources Agency. Third Edition.

Keller, E.A., and E.K. Hoffman. 1977. Urban streams: sensual blight or amenity. Journal of Soil and Water Conservation 32:237-242.

Montgomery, D.R., B.D. Collins and J.M. Buffington. 2003. Geomorphic Effects in Rivers. American Fisheries Society Symposium 37: 21-47.

Rosgen, D. 1996. Applied River Morphology. Wildland Hydrology, Pagosa Springs, Colorado.

DRAFT

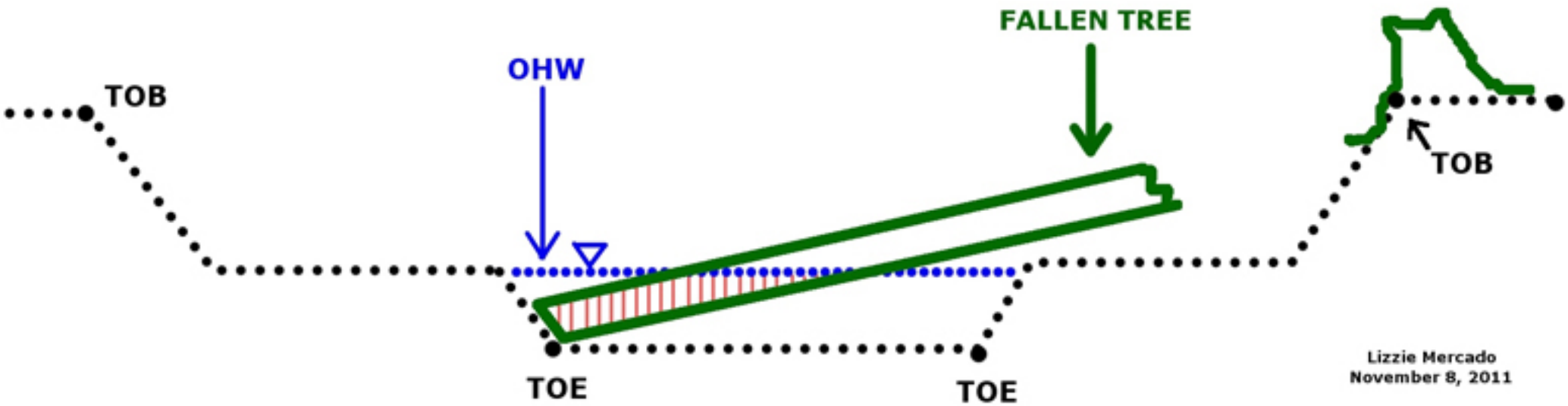
Attachment E
Figure 1

LARGE WOODY DEBRIS (LWD)

ACCOUNTING CRITERIA

NOTES:

1. OHW = Ordinary High Water
2. TOB = Top of Bank
3. LWD mitigation is required for all wood removed that:
   a. is located below OHW
   b. AND also has a diameter ≥ 30 cm (12 inches)
   c. AND also has a length ≥ 1 meter (40 inches)



Lizzie Mercado
November 8, 2011

ATTACHMENT F

Best Management Practices (BMPs)

2012-2022 Stream Maintenance Program

Table 2-12. BMPs Listings

A. SECTION A –Pre-Project Planning and General BMPs

General BMPs are applicable program-wide, for most routine SMP maintenance activities. These measures include standard construction practices and impact avoidance measures that will minimize potential environmental impacts. These BMPs will be implemented by the stream maintenance crew, as appropriate and as overseen by site managers, for all activities associated with the maintenance program. The majority of these BMPs are implemented prior to and during maintenance operations, though the level of activity varies depending on the work type.

Other General BMPs are conducted prior to implementing maintenance activities on site. This group of measures includes procedures to identify site or maintenance constraints, such as biological or cultural resource surveys which coincide with permit compliance requirements. Site design constraints for sediment and bank stabilization activities in particular are also identified as part of the pre-project planning process.

BMP Number	BMP Title	BMP Description
GEN-1	In-Channel Work Window	All ground-disturbing maintenance activities (i.e., sediment removal, bank stabilization, tree removal, and mechanized vegetation management) occurring in the channel (below bankfull) will take place between June 15 and October 15. Requests for work window extensions must be submitted to the regulatory agencies by October 1st, listing the creek names and reaches where a work extension will occur. Work extensions vary per work activity. The agencies will provide a single response within one week. Significant rainfall applies after October 15. An extension through December 31 may apply if the following requirements are met and regulatory agency approval is received: For ground-disturbing activities: ▪ Work may continue if no significant rainfall, defined as greater than 0.5 inches per 24 hours within a local watershed, is either forecasted[1] or observed. Following October 15th, maintenance work shall cease for the season if such a rain event is forecasted or observed. Sediment removal ▪ Extended Work Window: 1. Creeks supporting anadromous fish: An extended work window may occur from October 15 through October 31, or until local rainfall of 0.5 inches or greater falls within the subject watershed within a 24-hour period, whichever occurs first. 2. Creeks not supporting anadromous fish: An extended work window may occur from October 15 through November 30th, or until local rainfall of 0.5 inches or greater falls within the subject watershed within a 24-hour period, whichever occurs first. ▪ Extended Work Window in Lower Quality Areas: 1. ~~After a significant rainfall event (0.5 in/24 hrs), s~~Sediment removal work may occur until December 31. 2. Work will only occur on Berryessa Creek (0-88+80; 232+70-236+00; 284+30-288+00), Lower Silver Creek (Reach 3 between Stations 37+40 and 381+19), Thompson Creek (0+00-10+00), Canoas Creek (0+00-390+00), ~~and~~ Ross Creek (0+00-86+30), Calabazas Creek (35+00-105+00), and San

[1] Weather Forecasts. No phase of the project may be started if that phase and its associated erosion control measures cannot be completed prior to the onset of a storm event if that construction phase may cause the introduction of sediments into the stream. Seventy-two-hour weather forecasts from the National Weather Service or other localized and more detailed weather forecast service will be consulted prior to start up of any phase of the project that may result in sediment runoff to a stream.

BMP Number	BMP Title	BMP Description
		Tomas Aquino Creek (80+00-100+00) ~~can continue~~ with the following conditions: o site conditions are dry and access for all construction equipment and vehicles will not impact waterways; and o all work will stop if any rainfall is forecast for the next 72 hour period.~~, and~~ ~~o email notification of work status will be provided to regulatory agencies two days in advance of scheduled work.~~ 3. Work may occur after a significant rainfall event but no later than December 31. 4. Sites must be maintained in a rapidly winterizable[2] state (implement control measures BMP GEN-20). Bank stabilization projects ~~that are 50% complete by October 15~~ may continue until the approved date stated below~~completion or until 0.5 inches of rain is predicted in the next 24-hr period~~. Prior to a forecasted significant rainfall event (0.5 in/24 hrs), all incomplete bank stabilization projects must be winterized. 1. In Creeks Supporting Anadromous Fish o An extended work window may occur until October 31st for bank stabilization projects that will be 50% complete by October 15th. 2. In Creeks Not Supporting Anadromous Fish o An extended work window may occur until November 30th for projects that will be 50% complete by October 15th or until significant rainfall. o An extended work window may occur until November 30th for new bank stabilization projects that will be completed in five (5) days or less, or until significant rainfall. ▪ Instream hand pruning and hand removal of vegetation will occur year round, except when: o Wheeled or tracked equipment needs to access the site by crossing a creek, ponded area, or secondary channel; or o Work occurs in streams that support steelhead. In these streams instream vegetation maintenance will cease on December 31 or when local rainfall greater than 0.5 inches is predicted within a 24-hour period of planned activities, whichever happens first. Modification and removal of instream large woody debris will occur at any time of the year, and as further described in the NMFS Biological Opinion.~~if imminent danger of a flood threat precludes leaving the wood in place.~~
GEN-2	Instream Herbicide Application Work Window	Instream herbicide applications will take place between June 15 and October 15~~31~~, with an extension through December 31 or until the first occurrence of any of the following conditions; whichever happens first: ▪ local rainfall greater than 0.5 inches is forecasted within a 24-hour period from planned application events; or ▪ when steelhead begin upmigrating and spawning in the 14 steelhead creeks, as determined by a qualified biologist (typically in November/December), o A qualified biologist will determine presence/absence of sensitive resources in designated herbicide use areas and develop site-specific control methods (including the use of approved herbicide and surfactants). Proposed herbicide use would be limited to the aquatic formulation of

[2] Winterization is the process to maintain work sites with the appropriate BMP's to prevent erosion, sediment transport, and protect water quality. Winterization occurs upon completion of bank repairs or on incomplete projects after October 15 and prior to the forecast of significant rainfall, 0.5 inches or greater of local watershed rainfall within 24 hours. Winterization shall be completed prior to the occurrence of such actual significant rainfall.

BMP Number	BMP Title	BMP Description
		glyphosate (Rodeo or equal). Surfactant use would be limited to non-ionic products, such as Agri-dex, Competitor, or another brand name using the same ingredients. Any modifications to these materials would require review and approval by NMFS and CDFG. o A qualified fisheries biologist will review proposed herbicide application methods and stream reaches. The fisheries biologist would conduct a pre-construction survey (and any other appropriate data research) to determine whether the proposed herbicide application is consistent with SMP approvals concerning biological resources and determine which BMPs would be instituted for work to proceed. In addition, herbicide application requirements are as follows: ▪ no direct application into water; ▪ herbicide application shall not occur when wind conditions may result in drift; ▪ herbicide shall only be applied after the surfactant has a "wet" appearance on the target plants in order to avoid run off; and ▪ where permitted, surfactants shall be added to the spray solution prior to application.
GEN-3	Avoid Exposing Soils with High Mercury Levels	Sediment removal and bank stabilization projects in portions of the Guadalupe River watershed affected by historic mercury mining may expose soils containing mercury. 1. In specified maintenance reaches in the Guadalupe River Basin, soils that are likely to be disturbed or excavated shall be tested for mercury (Hg). Soils shall be remediated if: a. disturbed or excavated soils exposed to streamflow below the elevation of the 2.33-year flow event exceed 1 ppm Hg; or b. disturbed or excavated soils above the 2.33-year flow level exceed 20 ppm Hg. 2. Remediation may be accomplished either by: a. treating the site so that contaminated soils excavated for the purpose of bank stabilization shall not be susceptible to erosion; or b. further excavating contaminated soils and replacing them with clean fill or other bank stabilization materials that are free from contaminants. c. Soils with mercury concentrations exceeding 20 mg/kg shall be removed and disposed of in a Class I landfill following established work practices and hazard control measures. Soils with mercury concentrations less than 20 mg/kg will remain at the project site. 3. To ensure worker safety during sediment removal and bank stabilization projects with elevated mercury concentrations in the exposed surfaces, personal protective equipment will be required during project construction to maintain exposure below levels established by the Occupational Safety and Health Agency (OSHA).

Biological Resources

GEN-4	Minimize the Area of Disturbance	To minimize impacts to natural resources, soil disturbance will be kept to the minimum footprint necessary to complete the maintenance operation.
GEN-5	Mitten Crab Control Measure	Sediment from the San Francisco Bay Watershed, including that for reuse, cannot be moved to areas any farther south than Coyote Creek Golf Drive in south San Jose, and the intersection of McKean and Casa Loma Roads.
GEN-6	Minimize Impacts to Nesting Birds via Site	1. For activities occurring between January 15 and August 31, project areas will be checked by a qualified biologist or Designated Individuals (DI – for limited ground nesting species surveys), for nesting birds within 2

BMP Number	BMP Title	BMP Description
	Assessments and Avoidance Measures	weeks prior to starting work. If a lapse in project-related work of 2 weeks or longer occurs, another focused survey will be conducted before project work can be reinitiated. 2. If nesting birds are found, a buffer will be established around the nest and maintained until the young have fledged. Appropriate buffer widths are 0.5 mile for bald and golden eagles; 250 feet for other raptors and the least Bell's vireo, herons, and egrets; 25 feet for ground-nesting non-raptors; and 50 feet for non-raptors nesting on trees, shrubs and structures. A qualified biologist may identify an alternative buffer based on a site specific-evaluation. No work within the buffer will occur without written approval from a qualified biologist, for as long as the nest is active. 3. All vegetation management, sediment reuse, road grading, or other SMP activities in or immediately adjacent to suitable California clapper rail or Alameda song sparrow nesting habitat, as determined by a qualified biologist, shall not be conducted prior to September 1 (the non-nesting season). 4. If a pre-activity survey in high-quality San Francisco common yellowthroat breeding habitat (as determined by a qualified biologist) identifies more singing male San Francisco common yellowthroats than active nests, then the inconspicuous nests of this species might have been missed. In that case, maintenance activities in that area shall be delayed until the San Francisco common yellowthroat non-breeding season (i.e., August 16–March 14). 5. The boundary of each buffer zone will be marked with fencing, flagging, or other easily identifiable marking if work will occur immediately outside the buffer zone. 6. All protective buffer zones will be maintained until the nest becomes inactive, as determined by a qualified biologist. 7. If monitoring shows that disturbance to actively nesting birds is occurring, buffer widths will be increased until monitoring shows that disturbance is no longer occurring. If this is not possible, work will cease in the area until young have fledged and the nest is no longer active.
GEN-6.5	Protection of Nesting Least Bell's Vireos	1. To the extent feasible, SMP activities within woody riparian habitat along portions of lower Llagas Creek downstream from Highway 152, the Pajaro River from Llagas Creek downstream, and lower Uvas/Carnadeo Creek downstream from Hecker Pass Road shall be scheduled to occur outside of the least Bell's vireo nesting season (March 15 – July 31). 2. For activities within woody riparian habitat along the aforementioned creek reaches that will occur between March 15 and July 31, any work will be preceded by a focused survey for least Bell's vireos. Pre-activity surveys will consist of two site visits, conducted on separate days within 14 days before the initiation of maintenance activities in the given area, with at least one of these surveys occurring within 7 days before the initiation of such activities. Surveys will be conducted between dawn and 11:00 a.m., during mild weather conditions (i.e., not during excessive cold, heat, wind, or rain), within all riparian habitat in and within 250 feet of any proposed maintenance location along these reaches. The surveys will be conducted by a qualified biologist who is familiar with the visual and auditory identification of this species. 3. To minimize impacts to nesting least Bell's vireos and other birds, the biologist will not initially be looking for Bell's vireo nests during these surveys. Rather, the biologist will look and listen for individual vireos. If a least Bell's vireo is detected, it will be observed to determine whether it is actively nesting. The biologist will note the nest location, or if finding the actual nest could result in excessive disturbance or risk damaging the nest, the biologist will determine the approximate location, based on observation of birds carrying nesting material, carrying food, or repeatedly visiting a certain area.

BMP Number	BMP Title	BMP Description
		4. If an active nest is found, a minimum 250-foot no-activity buffer will be established around the nest. If a territorial male is found but no nest can be detected, then the approximate centroid of the bird's area of activity will be the point from which the buffer will be applied. The required buffer may be reduced in areas where dense riparian forest occurs between the construction activities and the active nest or where sufficient barriers or topographic relief exists to protect the nest from excessive noise or other disturbance. The biologist will coordinate with the USFWS and CDFG to evaluate exceptions to the minimum no-activity buffer distance on a case-by-case basis. 5. No work will occur within the buffer without verification by a biologist that the nest is inactive and until any fledged young are no longer dependent on adults for food.
GEN-7	Protection of Burrowing Owls	1. ~~If burrowing owls are present, then w~~Work within 250 feet of an occupied burrow will be delayed until after the nesting season. 2. If suitable burrowing owl habitat is identified where mowing is proposed, or active burrows are found, they will be marked in such a way that the mower can identify the locations of such burrows. Mowing can then occur anywhere beyond the 250 foot buffer zone. Within the 250 foot buffer zone mowing may be done to within 10 feet of an active burrow provided there are~~is~~ no burrowing owls active on the surface. An on-site monitor will observe the area in front of the mower from a safe vantage point while it is in operation. In areas within 10 ft of active burrows the vegetation may be removed by hand (e.g., weed-whackers). All mowing and hand-removal of vegetation within 250 ft of a burrow will be done as quickly as possible to minimize disturbance of burrowing owls. 3. All markers will be removed once mowing is complete. 4. For burrow destruction work, all burrows within the 250-foot buffer zone around known, occupied burrows will be inspected with a burrow camera prior to destruction to ensure no entrapment of burrowing owls. Burrows that are difficult to inspect due to intricate subterranean configuration or depth will be inspected in stages where the uninspected section of the burrow will be protected while the previously inspected section is excavated. If maintenance activities will directly impact occupied burrows the District will consult with the DFG and FWS on establishing alternative burrows (including artificial burrows) and a process for removing owls from the active burrow. No burrowing owls will be evicted from burrows during the nesting season.
GEN-8	Protection of Sensitive Fauna Species from Herbicide Use	Approved herbicides and adjuvants may be applied in habitat areas for sensitive wildlife species (including steelhead, California red-legged frog, California tiger salamander, salt marsh harvest mouse, and Bay checkerspot butterfly); all applications will occur in accordance with federal and state regulations. For sprayable or dust formulations: when the air is calm or moving away from sensitive wildlife habitat, applications will commence on the side nearest the habitat and proceed away from the habitat. When air currents are moving toward habitat, applications will not be made within 200 yards by air or 40 yards by ground upwind from occupied habitat. However, these distances may be modified for the control of invasive species on salmonid streams if the following measures are implemented: ▪ A qualified biologist will determine presence/absence of sensitive resources in designated herbicide use areas and develop site-specific control methods (including the use of approved herbicide and surfactants). Proposed herbicide use would be limited to the aquatic formulation of glyphosate (Rodeo or equal). Surfactant use would be limited to non-ionic products, such as Agri-dex, Competitor, or another brand name using the same ingredients. Any modifications to these materials would require review and approval

BMP Number	BMP Title	BMP Description
		by NMFS and CDFG. ▪ A qualified fisheries biologist will review proposed herbicide application methods and stream reaches. The fisheries biologist would conduct a pre-construction survey (and any other appropriate data research) to determine whether the proposed herbicide application is consistent with SMP approvals concerning biological resources and determine which BMPs would be instituted for work to proceed.
GEN-9	Avoid Impacts to Special-Status Plant Species and Sensitive Natural Vegetation Communities	A qualified botanist will identify special status plant species and sensitive natural vegetation communities and clearly map or delineate them as needed in order to avoid and/or minimize disturbance, using the DFG protocols and the *CNPS Botanical Survey Guidelines* to formulate the following protocols: 1. A qualified botanist will use the GIS database, CNDDB, and/or other suitable tools to identify special status plants and sensitive natural vegetation communities located within or near work areas. 2. Surveys of areas identified as sensitive natural communities or suitable habitat for special status plant species will be conducted by a qualified botanist prior to commencement of work. 3. Surveys will be conducted during the appropriate time of the year to adequately identify special-status plants that could occur on the site of proposed maintenance activities. 4. The qualified botanist will ensure avoidance and/or minimize impacts by implementing one or more of the following, as appropriate, per the botanist's recommendation: a) Flag or otherwise delineate in the field the special status plant populations and/or sensitive natural community to be protected; b) Allow adequate buffers around plants or habitat; the location of the buffer zone will be shown on the maintenance design drawings and marked in the field with stakes and/or flagging in such a way that exclusion zones are visible to maintenance personnel without excessive disturbance of the sensitive habitat or population itself (e.g., from installation of fencing). c) Time construction or other activities during dormant and/or non-critical life cycle period; d) Store removed sediment off site; and e) Limit the operation of maintenance equipment to established roads whenever possible. 5. No herbicides, terrestrial or aquatic, will be used in areas identified as potential habitat for special status plant~~s~~ species or containing sensitive natural communities, until a qualified botanist has surveyed the area and determined the locations of special status plant species present. 6. If special status plant species or sensitive communities are present, then a qualified botanist will determine if a given type of vegetation management method is ecologically appropriate for a given area. Alternative strategies based on the botanist's recommendations will be coordinated with appropriate staff. 7. All impacts to sensitive natural communities and special status plants identified by the qualified botanist will be avoided and/or minimized
GEN-10	Avoid Impacts to Bay Checkerspot Butterfly and Associated Critical Habitat	1. Areas supporting Bay checkerspot larval host plants will be identified by a qualified botanist and protected from disturbance to the extent feasible, by establishing buffer zones around individual plants or populations. The size of the buffer will be determined by a qualified botanist; the actual distance will depend on the plant species potentially affected and the type of disturbance. No herbicide will be applied to the buffer area, and to the extent feasible, maintenance personnel and equipment will not operate within such areas. 2. Herbicides may be used in serpentine areas that do not contain Bay checkerspot butterfly larval host plants or sensitive plant species and habitat when approved by a qualified botanist and for the following maintenance purposes:

BMP Number	BMP Title	BMP Description
		a) To protect sensitive species and habitat; b) To manage for control of invasive and non-native plants; and/or c) To maintain access to a facility.
GEN-11	Protection of Salt Marsh Harvest Mouse and California Clapper Rail	1. A District qualified biologist will conduct a desk audit to determine whether suitable Salt Marsh Harvest Mouse (SMHM) or California Clapper Rail (CCR) habitat is present in or adjacent to a maintenance activity. 2. Within 7 days prior to work within the range of the Salt Marsh Harvest Mouse (SMHM) or California Clapper Rail (CCR), as depicted on the District's GIS layers, the proposed project area will be surveyed by a qualified biologist to identify specific habitat areas. Surveyed areas will include work locations and access routes. 3. To minimize or avoid the loss of individuals, activities within or adjacent to California clapper rail and salt marsh harvest mouse habitat will not occur within two hours before or after extreme high tides (6.5 feet or above) when the marsh plain is inundated, because protective cover for those species is limited and activities could prevent them from reaching available cover. 4. Specific habitat areas are vegetated areas of cordgass (*Spartina* spp), marsh gumplant (*Grindelia* spp.), pickleweed (*Sarcocornia pacifica*), alkali heath, (*Frankenia* sp.), and other high marsh vegetation, brackish marsh reaches of creek with heavy accumulations of bulrush thatch (old stands), and high water refugia habitat that may include annual grasses, and shrubs immediately adjacent to channels. 5. Within the identified specific habitat areas, vegetation will be removed by hand from areas to be directly impacted by the work activities if possible (hand removal of vegetation in some channels may not be possible). 6. Prior to the initiation of work each day for all vegetation management work, ground or vegetation disturbance, operation of large equipment, grading, sediment removal, and bank stabilization work and prior to expanding the work area, if suitable habitat occurs within the immediate work area, a qualified biologist will conduct a pre-construction survey of all suitable habitat that may be directly or indirectly impacted by the day's activities (work area, access routes, staging areas). a. If during the initial daily survey or during work activities a CCR is observed within or immediately adjacent to the work area (50 feet), initiation of work will be delayed until the CCR leaves the work area. b. If during the initial daily survey or during work activities a SMHM or similar rodent is observed within or immediately adjacent to the work area (50 feet), initiation of work will be delayed until a *Site Specific Species Protection Form* can be developed and implemented by a qualified biologist to protect the SMHM or similar rodent is developed and implemented by the qualified biologist. Acceptable plan activities may include one or more of the following activities: 1) establishment of a buffer zone at least 50 feet in radius from the rodent; 2) ongoing active monitoring, 3) construction of silt fence barrier between maintenance work and location of the rodent, 4) delay of work activity until the qualified biologist can contact DFG and USFWS for additional direction. 7. Mowing using heavy equipment (tractors, boom mowers, rider mowers) will not be conducted in habitat areas or within 50 feet of habitat areas. If mowing with hand equipment is necessary within 50 feet of habitat areas, an on-site monitor will observe the area in front of the mower from a safe vantage point while it is in operation. If SMHM are detected within the area to be mown, no mowing will occur in that area. If CCR are detected within the area to be mown, the mowing will stop until the individual(s) have left the work area. 8. See ANI-2 for additional restrictions.

BMP Number	BMP Title	BMP Description
GEN-12	Protection of Special-Status Amphibian and Reptile Species	1. A District qualified biologist will conduct a desk audit to determine whether suitable special-status amphibian or reptile habitat is present in or adjacent to a maintenance activity. 2. If the District Wildlife or Fisheries Biologist determines that a special-status amphibian or reptile could occur in the activity area, a qualified biologist will conduct one daytime survey within a 7 day period preceding the onset of maintenance activities. a. If a special-status amphibian or reptile, or the eggs or larvae of a special status amphibian or reptile, ~~is~~are found within the activity area during a pre-activity survey or during project activities, the qualified biologist shall notify the project proponent about the special-status species and conduct the following work specific activities: i. For minor maintenance activities and for vegetation removal activities that will take less than 1 day, the qualified biologist shall conduct a special status species survey on the morning of and prior to the scheduled work. A. If no special status species is found, the work may proceed. B. If eggs or larvae of a special status species are found, a buffer will be established around the location of the eggs/larvae and work may proceed outside of the buffer zone. No work will occur within the buffer zone. Work within the buffer zone will be rescheduled until the time that eggs have hatched and/or larvae have metamorphosed. C. If an active western pond turtle nest is detected within the activity area, a ~~25~~ 50-foot buffer zone around the nest will be established and maintained during the breeding and nesting season (April 1 – August 31). The buffer zone will remain in place until the young have left the nest, as determined by a qualified biologist. D. If adults or non-larval juveniles of a special status species are found, one of the following two procedures will be implemented: i. If, in the opinion of the qualified biologist, capture and removal of the individual to a safe place outside of the work area is less likely to result in adverse effects than leaving the individual in place and rescheduling the work (e.g., if the species could potentially hide and be missed during a follow-up survey), the individual will be captured and relocated by a qualified biologist (with USFWS and/or CDFG approval, depending on the listing status of the species in question), and work may proceed. ii. If, in the opinion of the qualified biologist, the individual is likely to leave the work area on its own, and work can be feasibly rescheduled, a buffer will be established around the location of the individual(s) and work may proceed outside of the buffer zone. No work will occur within the buffer zone. Work within the buffer zone will be rescheduled. ii. For minor maintenance and vegetation removal activities that will take more than 1 day, the qualified biologist shall conduct a special-status species survey on each morning of and prior to the scheduled work commencing. E. If eggs or larvae of a special status species are found, a buffer will be established around the location of the eggs/larvae and work may proceed outside of the buffer zone. No work will occur within the buffer zone. Work within the buffer zone will be rescheduled until the time that eggs have hatched and/or larvae have metamorphosed. F. If an active western pond turtle nest is detected within the activity area, a ~~25~~50 ft-buffer zone around the nest will be established and maintained during the breeding and nesting season

BMP Number	BMP Title	BMP Description
		(April 1 – August 31). The buffer zone will remain in place until the young have left the nest, as determined by a qualified biologist. G. If adults or non-larval juveniles of a special status species are found, the individual will be captured and relocated by a qualified biologist (with USFWS and/or CDFG approval, depending on the listing status of the species in question), and work may proceed. iii. For Sediment Removal and Bank Stabilization Projects the wildlife or fisheries biologist in cooperation with the project proponent shall complete a *Site Specific Species Protection Form for the project*. Elements of the form include: work rescheduling, training work crews, daily surveys, establishment of buffers and buffer fencing, on-site monitoring, habitat modification in advance of work activities, capture and relocation of individual special-status species, methods of documentation, and reporting of results. b. If no special status amphibian or reptile is found within the activity area during a pre-activity survey, the work may proceed. c. During animal conflict management activities, if special status species are found within a burrow proposed for destruction, a qualified biologist will determine an appropriate buffer distance around that burrow to ensure adequate protection of the habitat. The buffer area may include not destroying adjacent burrows as that may damage subterranean networks of the occupied burrow or produce substrate vibrations which could interfere with prey detection mechanisms. If two consecutive follow up surveys are conducted (spaced 30 days apart) in which the burrow is found to be unoccupied, work can proceed as planned. A naturally found back filled burrow known to have been inhabited by a special-status species will be presumed to still be occupied by that species and a clearly delineated buffer demarcation of the burrow area will be in place for the duration of nearby work activities. In rare instances in which destruction of the burrow is not avoidable during animal conflict management, the animal will be relocated to a safe burrow outside the impact area, with USFWS and/or CDFG approval, depending on the listing status of the species in question. A biologist will observe the relocated animal until it is certain that the animal is not in immediate danger of desiccation or predation.

BMP Number	BMP Title	BMP Description
GEN-13	Protection of Bat Colonies	1. A District Wildlife Biologist will conduct a desk audit to determine whether suitable habitat (appropriate roost trees or anthropogenic structures) is present for bat colonies within 100 feet of the work site, staging areas, or access routes. 2. If potential bat colony habitat is determined to be present, within two weeks prior to the onset of work activities a qualified biologist will conduct a survey to look for evidence of a bat use. If evidence is observed, or if potential roost sites are present in areas where evidence of bat use might not be detectable (such as a tree cavity), an evening survey and/or nocturnal acoustic survey may be necessary to determine if the bat colony is active and to identify the specific location of the bat colony. 3. If an active bat maternity colony is present then the qualified biologist will make the following determinations: a. The work can proceed without unduly disturbing the bat colony b. There is a need for a buffer zone to prevent disturbance to the bat colony, and implementation of the buffer zone (determined on a case-by-case basis by a qualified biologist) will reduce or eliminate the disturbance to an acceptable level. c. Work cannot proceed without unduly disturbing the bat colony; thus, the work will be postponed until after July 31. 4. If a non-breeding bat hibernaculum is found in a tree or structure that must be removed or physically disturbed, the qualified biologist will consult with DFG prior to initiating any removal or exclusion activities.
GEN-14	Protection of San Francisco Dusky-footed Woodrat	1. Prior to work within riparian, oak woodland, or coyote brush scrub habitat, or the removal of any oak trees outside these habitats, a District Wildlife Biologist will conduct a desk audit to determine whether woodrats could be present within suitable habitat for San Francisco dusky-footed woodrat or is known to be present in or adjacent to a maintenance activity site. 2. If the District Wildlife Biologist determines that no San Francisco dusky-footed woodrat habitat is present, or there is habitat present but will not be affected by the maintenance activity, then no further action is required. 3. If the District Wildlife Biologist determines that suitable San Francisco dusky-footed woodrat habitat is present and may be affected by the maintenance activity, a qualified biologist shall conduct a pre-activity survey within 2 weeks prior to the start of work to determine if woodrat nests are in, or within 5 feet of, the immediate activity area. a. If woodrat nests are present at the site and will be affected by the work activity area, the District Wildlife Biologist in cooperation with the project proponent will evaluate the site specific situation. The Wildlife Biologist will then develop a site specific woodrat management plan to first avoid and second minimize take or injury of the woodrat(s). The woodrat management plan may include: establishment of buffers zones, installation of buffer zone fences, relocation of the woodrat nest, removal of the woodrat nest, and/or construction of artificial nests. Consideration will be given to the number of woodrat nests that may be affected by the work activity and the number in the project vicinity that may not be affected.

BMP Number	BMP Title	BMP Description
GEN-15	Salvage Native Aquatic Vertebrates from Dewatered Channels	If fisheries or native aquatic vertebrates are present when cofferdams, water bypass structures, and silt barriers are to be installed, a fish and native aquatic vertebrate relocation plan shall be implemented to ensure that fish and native aquatic vertebrates are not stranded. Relocation efforts will be based on the District's Fish Relocation Guidelines. Streams that support a sensitive species (i.e. steelhead) will require a relocation effort and/ or initial onsite monitoring by a qualified biologist depending on seasonal conditions: 1. In non-tidal channels, where water is to be diverted, prior to the start of work or during the installation of water diversion structures, native aquatic vertebrates shall be captured in the work area and transferred to another reach as determined by a qualified biologist. Timing of work in streams that supports a significant number of amphibians will be delayed until metamorphosis occurs to minimize impacts to the resource. Capture and relocation of aquatic native vertebrates is not required at individual work sites when site conditions preclude reasonably effective operation of capture gear and equipment. 2. Aquatic invertebrates will not be transferred (other than incidental catches) because of their anticipated abundance and colonization after completion of the repair work.
GEN-15.5	Avoidance of Impacts on the San Joaquin Kit Fox	1. A qualified District biologist will conduct a desk audit to determine whether an SMP activity will occur in an area where the San Joaquin kit fox could potentially occur (i.e., roughly east of Frazier Lake Road and south of Bloomfield Avenue), and in potential habitat for the species. 2. If the District biologist determines that an SMP activity could occur in an area that could potentially support a kit fox, the SCVWD will implement applicable pre-activity surveys and other measures in accordance with the USFWS's *San Joaquin Kit Fox Survey Protocol for the Northern Range*, as follows: a) Conduct a preconstruction/pre-activity survey no less than 14 days and no more than 30 days prior to the beginning of project implementation. Surveys shall identify kit fox habitat features on the project site and evaluate use by kit fox and, if possible, and assess the potential impacts to the kit fox by the proposed activity. The status of all dens shall be determined and mapped in accordance with the survey protocol. b) If a natal/pupping den is discovered within the project area or within 200 feet of the project boundary, the USFWS shall be immediately notified. Disturbance to all San Joaquin kit fox dens should be avoided to the maximum extent possible. Destruction of any known or natal/pupping kit fox den would require take authorization from the USFWS. c) The project proponent will establish exclusion zones around the kit fox dens, if determined to be present. The configuration of the exclusion should have a radius measured outward from the entrance or cluster of entrances. The following radii are minima to be applied: ▪ Potential den: 50 feet ▪ Known den: 100 feet ▪ Natal/pupping den: Service must be contacted (occupied and unoccupied) ▪ Atypical den: 50 feet. 3. <u>If take of the San Joaquin kit fox will occur, take authorization from the USFWS and CDFG will be necessary.</u>

BMP Number	BMP Title	BMP Description
General Maintenance Practices		
GEN-16	In-Channel Minor Activities	For in-channel minor work activities, work will be conducted from the top of the bank if access is available and there are flows in the channel.
GEN-17	Employee/Contractor Training	All appropriate District staff and contractors will receive annual training on Stream Maintenance Program BMPs. The training will also include an overview of special-status species identification and habitat requirements. District staff and contractors will receive fact sheets to assist with in-the-field identification of special-status species and their habitats.
GEN-18	Paperwork Required On-site	1. Copies of regulatory permits related to the Stream Maintenance Program will be kept on-site and available for review, if requested by regulatory personnel. 2. Copies of the Stream Maintenance Program Manual and this BMP Manual will be kept on-site.
GEN-19	Work Site Housekeeping	1. District employees and contractors will maintain the work site in neat and orderly conditions on a daily basis, and will leave the site in a neat, clean, and orderly condition when work is complete. 2. Slash, sawdust, cuttings, etc. will be removed to clear the site of vegetation debris. As needed, paved access roads and trails will be swept and cleared of any residual vegetation or dirt resulting from the maintenance activity. 3. For activities that last more than one day, materials or equipment left on the site overnight will be stored as inconspicuously as possible, and will be neatly arranged. Any materials and equipment left on the site overnight will be stored to avoid erosion, leaks, or other potential impacts to water quality (see BMPs GEN-24). 4. The District's maintenance crews are responsible for properly removing and disposing of all debris incurred as a result of construction within 72 hours of project completion. 5. All trash that is brought to a project site during maintenance activities (e.g., plastic water bottles, plastic lunch bags, cigarettes) will be collected at the site daily.
GEN-20	Erosion and Sediment Control Measures	1. Soils exposed due to maintenance activities will be seeded and stabilized using hydroseeding, straw placement, mulching, and/or erosion control fabric. These measures will be implemented such that the site is stabilized and water quality protected prior to significant rainfall. The channel bed and areas below the Ordinary High Water Mark (OHWM) are exempt from this BMP. 2. The preference for erosion control fabrics will be to consist of natural fibers; however, steeper slopes and areas that are highly erodible may require more structured erosion control methods. No non-porous fabric will be used as part of a permanent erosion control approach. Plastic sheeting may be used to temporarily protect a slope from runoff, but only if there are no indications that special-status species would be impacted by the application. 3. Erosion control measures will be installed according to manufacturer's specifications. 4. Appropriate measures include, but are not limited to, the following: o Silt Fences o Straw Bale Barriers o Brush or Rock Filters o Storm Drain Inlet Protection o Sediment Traps o Sediment Basins o Erosion Control Blankets and Mats

BMP Number	BMP Title	BMP Description
		o Soil Stabilization (i.e. tackified straw with seed, jute or geotextile blankets, etc.) o Wood chips o Straw mulch 5. All temporary construction-related erosion control methods shall be removed at the completion of the project (e.g. silt fences). 6. Surface barrier applications installed as a method of animal conflict management, such as chain link fencing, woven geotextiles, and other similar materials, will be installed no longer than 300 feet, with at least an equal amount of open area prior to another linear installation; and only on one side of levee slopes. Inboard and outboard areas will only have installations set in an alternating pattern, such that no inboard and outboard levee faces would have erosion control blankets along the same levee stationing.
GEN-21	Staging and Stockpiling of Materials	1. To protect on-site vegetation and water quality, staging areas should occur on access roads, surface streets, or other disturbed areas that are already compacted and only support ruderal vegetation. Similarly, all maintenance equipment and materials (e.g., road rock and project spoil) will be contained within the existing service roads, paved roads, or other pre-determined staging areas. 2. Building materials and other maintenance-related materials, including chemicals and sediment, will not be stockpiled or stored where they could spill into water bodies or storm drains. Materials will not be stockpiled longer than seven (7) calendar days. 3. No runoff from the staging areas may be allowed to enter water ways, including the creek channel or storm drains, without being subjected to adequate filtration (e.g., vegetated buffer, swale, hay wattles or bales, silt screens). 4. The discharge of decant water to water ways from any on-site temporary sediment stockpile or storage areas is prohibited. 5. Wet material removed from an isolated creek reach may be pulled to the side of the channel (within the channel and below top of bank) and allowed to naturally drain prior to removal from the channel. Pulled material will be removed from the channel prior to deactivation of the site or forecast of rain. 6. During the wet season, no stockpiled soils will remain exposed, unless surrounded by properly installed and maintained (i.e., per manufacturer specifications) silt fencing or other means of erosion control. During the dry season; exposed, dry stockpiles will be watered, enclosed, covered, or sprayed with non-toxic soil stabilizers (GEN-24). 7. All pipes, culverts, or similar structures stored at a site within sensitive species areas, for one or more overnight periods shall be securely capped prior to storage or inspected before the pipe is subsequently moved. If any potential special-status species are observed within a pipe, a District biologist shall be consulted on what steps should be taken to protect the species. If a District biologist is on-site, they may remove the special status species from the pipes and relocate to the nearest appropriate and unaffected habitat.

BMP Number	BMP Title	BMP Description
GEN-22	Sediment Transport	To prevent sediment-laden water from being released back into waterways during transport of spoils to disposal locations, truck beds will be lined with an impervious material (e.g., plastic), or the tailgate blocked with wattles, hay bales, or other appropriate filtration material. Trucks may then drain excess water by slightly tilting the loads and allowing the water to drain out through the applied filter, but only within the active project area of the creek where the sediment is being loaded into the trucks or within an identified vegetated area (swale) that is separated from the creek.
GEN-23	Stream Access	District personnel will use existing access ramps and roads to the extent feasible. If necessary to avoid large mature trees, native vegetation, or other significant habitat features, temporary access points will be constructed in a manner that minimizes impacts according to the following guidelines: 1. Temporary access points will be constructed as close to the work area as possible to minimize equipment transport 2. In considering channel access routes, slopes of greater than 20 percent will be avoided, if possible. 3. Any temporary fill used for access will be removed upon completion of the project and pre-project topography will be restored to the extent possible. 4. When temporary access is removed, disturbed areas will be revegetated or filled with compacted soil, seeded, and/or stabilized with erosion control fabric immediately after construction to prevent future erosion. 5. Personnel will use the appropriate equipment for the job that minimizes impacts and disturbance to the stream bottom. Appropriately-tired vehicles, either tracked or wheeled, will be used depending on the site and maintenance activity.
GEN-24	On-Site Hazardous Materials Management	1. An inventory of all hazardous materials used (and/or expected to be used) at the worksite and the end products that are produced (and/or expected to be produced) after their use will be maintained by the worksite manager. 2. As appropriate, containers will be properly labeled with a “Hazardous Waste” label and hazardous waste will be properly recycled or disposed of off-site. 3. Contact of chemicals with precipitation will be minimized by storing chemicals in watertight containers with appropriate secondary containment to prevent any spillage or leakage. 4. Quantities of toxic materials, such as equipment fuels and lubricants, will be stored with secondary containment that is capable of containing 110% of the primary container(s). 5. Petroleum products, chemicals, cement, fuels, lubricants, and non-storm drainage water or water contaminated with the aforementioned materials will not contact soil and not be allowed to enter surface waters or the storm drainage system. 6. All toxic materials, including waste disposal containers, will be covered when they are not in use, and located as far away as possible from a direct connection to the storm drainage system or surface water. 7. Sanitation facilities (e.g., portable toilets) will be placed outside of the creek channel and floodplain. Direct connections with soil, the storm drainage system, and surface waters will be avoided. 8. Sanitation facilities will be regularly cleaned and/or replaced, and inspected daily for leaks and spills.~~.~~
GEN-25	Existing Hazardous Materials	If hazardous materials, such as oil, batteries or paint cans, are encountered at the maintenance sites, the District will carefully remove and dispose of them according to applicable regulatory requirements. District staff will wear proper protective gear and store the waste in appropriate hazardous waste containers until it can be disposed at a hazardous waste facility.
GEN-26	Spill Prevention and	The District will prevent the accidental release of chemicals, fuels, lubricants, and non-storm drainage water into

BMP Number	BMP Title	BMP Description
	Response	channels following these measures: 1. District field personnel will be appropriately trained in spill prevention, hazardous material control, and clean up of accidental spills. 2. Equipment and materials for cleanup of spills will be available on site and spills and leaks will be cleaned up immediately and disposed of according to applicable regulatory requirements. 3. Field personnel will ensure that hazardous materials are properly handled and natural resources are protected by all reasonable means. 4. Spill prevention kits will always be in close proximity when using hazardous materials (e.g., at crew trucks and other logical locations). All field personnel will be advised of these locations. 5. District staff will routinely inspect the work site to verify that spill prevention and response measures are properly implemented and maintained. *Spill Response Measures:* For small spills on impervious surfaces, absorbent materials will be used to remove the spill, rather than hosing it down with water. For small spills on pervious surfaces such as soil, the spill will be excavated and properly disposed rather than burying it. Absorbent materials will be collected and disposed of properly and promptly. If a hazardous materials spill occurs that cannot be contained or cleaned up with the onsite materials, the onsite District field personnel will be responsible for immediately initiating an emergency response sequence by notifying the proper authorities (i.e., District Emergency Response (ER) Team and public fire and hazmat agencies) of the release; taking appropriate defensive steps from a safe distance to secure the site to minimize damage to people, environment, and property (PEP); and deferring all other response activities to public emergency response agencies and/or the District Emergency Response (ER) Team or District ER Contractor. Depending on the nature of the release, the District ER Team's actions will include: urgent (responding within 2 hours of notification) field response site reconnaissance, emergency sequence initiation, defensive containment, release control, incident command; or priority (non 2-hour) field response site reconnaissance and clean-up operations. If a "reportable" spill of petroleum products occurs, the District's Stream Maintenance Implementation Program Manager will be notified and action taken to contact the appropriate safety and cleanup crews. A reportable spill is defined as when: ▪ a film or sheen on, or discoloration of, the water surface or adjoining bank/shoreline is observed; or ▪ a sludge or emulsion is deposited beneath the surface of the water or adjoining banks/shorelines (40 Code of Federal Regulations 110); or when ▪ another violation of water quality standards is observed. A written description of the reportable release must be submitted to the appropriate Regional Water Quality Control Board and the California Department of Toxic Substances Control (DTSC). This submittal must contain a description of the release, including the type of material and an estimate of the amount spilled, the date of the release, an explanation of why the spill occurred, and a description of the steps taken to prevent and control future releases. If an appreciable spill has occurred, and results determine that project activities have adversely affected surface water or groundwater quality, a detailed analysis will be performed to the specifications of DTSC to identify the likely cause of contamination. This analysis will include recommendations for reducing or eliminating the source or mechanisms of contamination. Based on this analysis, the District or contractors will select and implement

BMP Number	BMP Title	BMP Description
		measures to control contamination, with a performance standard that surface and groundwater quality will be returned to baseline conditions. These measures will be subject to approval by the District, DTSC, and the Regional Water Quality Control Board.
GEN-27	Existing Hazardous Sites	Upon selection of maintenance project locations, the District will conduct a search for existing known contaminated sites, as part of its annual preparation of the Notice of Proposed Work (NPW), on the State Water Resource Control Board's GeoTracker Web site (http://www.geotracker.waterboards.ca.gov). The Geotracker search will only be performed for the District's ground disturbing activities. For any proposed ground disturbing maintenance sites located within 1,500 feet of any "open" sites where contamination has not been remediated, the District will contact the RWQCB case manager listed in the database. The District will work with the case manager to ensure maintenance activities would not affect cleanup or monitoring activities or threaten the public or environment.
GEN-28	Fire Prevention	1. All earthmoving and portable equipment with internal combustion engines will be equipped with spark arrestors. 2. During the high fire danger period (April 1–December 1), work crews will ~~: a) H~~have appropriate fire suppression equipment available at the work site.
GEN-29	Dust Management	The District will implement the Bay Area Air Quality Management District's (BAAQMD) required Dust Control Measures (http://www.baaqmd.gov/~/media/Files/Planning%20and%20Research/CEQA/BAAQMD%20CEQA%20Guidelines%20May%202011.ashx?la=en). Current measures stipulated by the BAAQMD Guidelines include the following: 1. All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) shall be watered two times per day. 2. All haul trucks transporting soil, sand, or other loose material off-site shall be covered. 3. All visible mud or dirt track-out onto adjacent public roads shall be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping is prohibited. 4. Water used to wash the various exposed surfaces (i.e., parking areas, staging areas, soil piles, graded areas, etc.) will not be allowed to enter the water way. 5. All vehicle speeds on unpaved roads shall be limited to 15 mph. 6. All roadways, driveways, and sidewalks to be paved shall be completed as soon as possible. Building pads shall be laid as soon as possible after grading unless seeding or soil binders are used. 7. Idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to 5 minutes (as required by the California airborne toxics control measure Title 13, Section 2485 of California Code of Regulations [CCR]). Clear signage shall be provided for construction workers at all access points. 8. All construction equipment shall be maintained and properly tuned in accordance with manufacturer's specifications. All equipment shall be checked by a certified visible emissions evaluator. 9. Post a publicly visible sign with the telephone number and person to contact at the lead agency regarding dust complaints. This person shall respond and take corrective action within 48 hours. The Air District's phone number shall also be visible to ensure compliance with applicable regulations.

BMP Number	BMP Title	BMP Description
GEN-30	Vehicle and Equipment Maintenance	1. All vehicles and equipment will be kept clean. Excessive build-up of oil and grease will be prevented. 2. All equipment used in the creek channel will be inspected for leaks each day prior to initiation of work. Maintenance, repairs, or other necessary actions will be taken to prevent or repair leaks, prior to use. 3. Incoming vehicles and equipment (including delivery trucks, and employee and subcontractor vehicles) will be checked for leaking oil and fluids. Vehicles or equipment visibly leaking operational fluids will not be allowed on-site. 4. No heavy equipment will operate in a live stream. This will not apply to activities for which no other option exists, such as sediment removal which cannot be conducted from top of bank, etc. In these cases, dewatering will be conducted as necessary, following the protocols in BMPs GEN-33 or GEN-34. 5. No equipment servicing will be done in the creek channel or immediate floodplain, unless equipment stationed in these locations cannot be readily relocated (i.e., pumps and generators). 6. If emergency repairs are required in the field, only those repairs necessary to move equipment to a more secure location, and that can be performed without releasing any material into the floodway or water, will be conducted in the channel or floodplain. 7. If necessary, all servicing of equipment done at the job site will be conducted in a designated, protected area to reduce threats to water quality from vehicle fluid spills. Designated areas will not directly connect to the ground, surface water, or the storm drain system. The service area will be clearly designated with berms, sandbags, or other barriers. Secondary containment, such as a drain pan, to catch spills or leaks will be used when removing or changing fluids. Fluids will be stored in appropriate containers with covers, and properly recycled or disposed of offsite.
GEN-31	Vehicle Cleaning	1. Equipment will be cleaned of any visible sediment or vegetation clumps before transferring and using in a different watershed to avoid spreading pathogens or exotic/invasive species. 2. Vehicle and equipment washing can occur on-site only as needed to prevent the spread of sediment, pathogens or exotic/invasive species. No runoff from vehicle or equipment washing is allowed to enter water bodies, including creek channels and storm drains, without being subjected to adequate filtration (e.g., vegetated buffers, straw wattles or bales, fiber rolls, and silt screens). The discharge of decant water from any on-site wash area to water bodies or to areas outside of the active project site is prohibited. Additional vehicle/equipment washing will occur at the approved wash area in the District's corporation yard.
GEN-32	Vehicle and Equipment Fueling	1. No fueling will be done in the channel (top-of-bank to top-of-bank) or immediate floodplain unless equipment stationed in these locations cannot be readily relocated (e.g., pumps and generators). 2. All off-site fueling sites (i.e., on access roads above the top-of-bank) will be equipped with secondary containment and avoid a direct connection to soil, surface water, or the storm drainage system. 3. For stationary equipment that must be fueled on-site, secondary containment, such as a drain pan or drop cloth, will be used to prevent accidental spills of fuels from reaching the soil, surface water, or the storm drain system.

BMP Number	BMP Title	BMP Description
Dewatering		
GEN-33	Dewatering for Non-Tidal Sites	When sediment removal and bank stabilization work area includes a flowing stream, the entire streamflow will be diverted around the work area by construction of a temporary dam and/or bypass. Where appropriate, stream flow diversions will occur via gravity driven systems. *A. Planning to avoid and minimize impacts to water quality and aquatic wildlife:* 1. For construction and monitoring of a stream flow bypass, the *Sediment Removal and Bank Stabilization Projects* checklist will be completed. 2. Recommendations by a qualified Fisheries Biologist to protect native fisheries and aquatic vertebrates will be incorporated into the bypass design. The recommendations may include but are not limited to: i. Screening the stream flow diversion source or pump to prevent entrainment of native fish or amphibian species. The screening dimensions will be appropriate to the species present. ii. Relocation of native aquatic vertebrates. This will include the methods to be used to capture and hold and move the aquatic vertebrates and a description of where the aquatic vertebrates will be relocated. 3. Depending on the channel configurations, sediment removal activities may occur where the flows are not bypassed around the work site as long as a berm is left between the work area and stream flows to minimize water quality impacts during excavation activities. The berm between the work and the live channel will be wide enough to prevent introduction of turbid water from the cell into the live channel. *B. Construction*: 1. The construction of facilities will be based on the water bypass plan. 2. Coffer dams will be installed both upstream and downstream of the work area to minimize impacts or the distance necessary to accomplish effective passive systems. 3. In streams where water may enter the construction site from downstream (reverse flow) additional coffer dams (downstream) may be necessary. When multiple coffer dams are constructed, the upstream dam will be constructed first. 4. ~~5.~~ Instream cofferdams will only be built from materials such as sandbags, earth fill, clean gravel, or rubber bladders which will cause little or no siltation or turbidity. 5. ~~4.~~ Plastic sheeting will be placed over k-rails, timbers, and earth fill to minimize water seepage into and out of the maintenance areas. The plastic sheets will be firmly anchored, using sandbags, to the streambed to minimize water seepage. 6. When pumping is necessary to dewater a work site, a temporary siltation basin and/or use of silt bags may be required to prevent sediment from re-entering the wetted channel. Pump intakes will be screened to prevent harm to aquatic wildlife. 7. If necessary to prevent erosion an energy dissipater will be constructed at the discharge point. 8. Timing of flow diversions will be coordinated with the completion of the dam structure to facilitate not drying up the downstream creek area and to minimize dry back conditions. *C. Implementation*:

BMP Number	BMP Title	BMP Description
		1. Water flows downstream of the project site will be maintained to prevent stranding aquatic vertebrates. 2. Water diverted around work sites and water detained by coffer dams will be protected from maintenance activity-related pollutants, such as soils, equipment lubricants or fuels. 3. The *Fish Relocation Guidelines* will be implemented to ensure that fish and other aquatic vertebrates are not stranded during construction and implementation of channel dewatering. a) Native aquatic vertebrates shall be captured in the work area and transferred to another reach as determined by a qualified biologist. Timing of work in streams that supports a significant number of amphibians will be delayed until metamorphosis occurs to minimize impacts to the resource. Capture and relocation of aquatic native vertebrates is not required at individual work sites when site conditions preclude reasonably effective operation of capture gear and equipment. b) Aquatic invertebrates will not be transferred (other than incidental catches) because of their anticipated abundance and colonization after completion of the repair work. 4. Filtration devices (silt bags attached to the end of discharge hoses and pipes to remove sediment from discharged water) or settling basins will be provided as necessary at discharge sites to ensure that the turbidity of discharged water is not visibly more turbid than the water in the channel upstream of the maintenance site. If increases in turbidity are observed, additional measures will be implemented such as a larger settling basin or additional filtration. If increases in turbidity persist, the District's Stream Maintenance Program Implementation Project Manager will be alerted since turbidity measurements may be required. 5. Water remaining in the work area will be removed by evaporation, seepage, or pumping. When pumping is required to dewater a site, the decanted water will be discharged with water bypassed around the site or in a separate erosion control – energy dissipation area/vegetated swale. The turbidity of discharged water will not be visibly more turbid than the receiving water. *Deconstruction*: 1. When maintenance is completed, the flow diversion structure will be removed as soon as possible. Impounded water will be released at a reduced velocity to minimize erosion, turbidity, or harm to downstream habitat. 2. Removal will normally proceed from downstream in an upstream direction. 3. When diversion structures are removed, the ponded water will be directed back into the low-flow channel in a phased manner to minimize erosion and downstream water quality impacts. Normal flows will be restored. 4. The area disturbed by flow bypass mechanisms will be restored to the pre-project condition at the completion of the project (to the extent practical). This may include, but is not limited to, recontouring the area and planting of riparian vegetation.

BMP Number	BMP Title	BMP Description
GEN-34	Dewatering in Tidal Work Areas	For tidal areas, a downstream cofferdam will be constructed to prevent the work area from being inundated by tidal flows. 1. Installation of cofferdams and fish exclusion measures will be installed at low tide when the channel and project site are at their driest. 2. It is preferable to not use any bypass pipes when work is being conducted on one side of the channel, if~~s~~ isolated by the cofferdam, and flows can continue on the other side of the creek channel without entering the project area. 3. If downstream flows cannot be diverted around the project site, the creek waters will be transmitted around the site through cofferdam bypass pipes. Waters discharged through tidal cofferdam bypass pipes will not exceed 50 NTUs over the background levels of the tidal waters into which they are discharged. 4. Cofferdams in tidal areas may be made from earthen or gravel material. If earth is used, the downstream and upstream faces will be covered by a protected covering (e.g., plastic or fabric) if needed to minimize erosion. A protected covering or sheeting will be placed on the water side of an earthen coffer dam to protect water quality. 5. When maintenance is completed, the cofferdams and bypass pipes will be removed as soon as possible but no more than 72 hours after work is completed. Flows will be restored at a reduced velocity to minimize erosion, turbidity, or harm to downstream habitat.
GEN-35	Pump/Generator Operations and Maintenance	When needed to assist in channel dewatering, pumps and generators will be maintained and operated in a manner that minimizes impacts to water quality and aquatic species. 1. Pumps and generators will be maintained according to manufacturers' specifications to regulate flows to prevent dryback or washout conditions. 2. Pumps will be operated and monitored to prevent low water conditions, which could pump muddy bottom water, or high water conditions, which creates ponding. 3. All pump intakes will be screened. Pumps in steelhead creeks will be screened according to NMFS criteria (http://www.swr.noaa.gov/sr/fishscrn.pdf) to prevent entrainment of steelhead.
Public Safety		
GEN-36	Public Outreach	The public will be informed of stream maintenance work prior to the start of work as part of the preparation of the NPW for all projects in the NPW: 1. Each spring, a newspaper notice will be published with information on the NPW work sites, approximate work dates, and contact information. 2. Neighborhood Work Notices will be distributed as part of the NPW preparation prior to the start of work. 3. Local governments (cities and County) will be notified of scheduled maintenance work. The ~~annual work plan~~ NPW will be submitted to the public works departments, local fire districts, and the District's ~~Zone Advisory Committee~~Flood Protection and Watershed Advisory Committees. 4. The District will post specific information on individual maintenance projects on the Stream Maintenance Web site: (http://valleywater.org/EkContent.aspx?id=379&terms=stream+maintenance) 5. For high profile projects, at the District's discretion, signs will be posted in the neighborhood to notify the public at least one week in advance of maintenance schedules, trail closures, and road/lane closures as necessary and as possible. Signage used at work sites will include contact information for lodging comments and/or complaints regarding the maintenance activities.
GEN-37	Implement Public Safety	The District will implement public safety measures during maintenance as follows:

BMP Number	BMP Title	BMP Description
	Measures	1. Construction signs will be posted at job sites warning the public of construction work and to exercise caution, as appropriate to public accessed areas. 2. Where work is proposed adjacent to a recreational trail, warning signs will be posted several feet beyond the limits of work. Signs will also be posted if trails will be temporarily closed. 3. If needed, a lane will be temporarily closed to allow for trucks to pull into and out of access points to the work site. 4. Temporary fencing, either the orange safety type or chain link, will be installed above repair sites on bank stabilization projects. 5. When necessary, District or contracted staff will provide traffic control and site security.
GEN-38	Minimize Noise Disturbances to Residential Areas	The District will implement maintenance practices that minimize disturbances to residential areas surrounding work sites. 1. With the exception of emergencies, work will be conducted during normal working hours. Maintenance activities in residential areas will not occur on Saturdays, Sundays, or District observed holidays except during emergencies, or with approval by the local jurisdiction and advance notification of surrounding residents. 2. Vehicles, generators and heavy equipment will be equipped with adequate mufflers. 3. Idling of vehicles will be prohibited beyond 5 minutes unless operation of the engine is required to operate a necessary system such as a power take-off (PTO).
GEN-39	Planning for Pedestrians, Traffic Flow, and Safety Measures	1. Work will be staged and conducted in a manner that maintains two-way traffic flow on public roadways in the vicinity of the work site. If temporary lane closures are necessary, they will be coordinated with the appropriate jurisdictional agency and scheduled to occur outside of peak traffic hours (7:00 – 10:00 a.m. and 3:00 – 6:00 p.m.) to the maximum extent practicable. Any lane closures will include advance warning signage, a detour route and flaggers in both directions. When work is conducted on public roads and may have the potential to affect traffic flow, work will be coordinated with local emergency service providers as necessary to ensure that emergency vehicle access and response is not impeded. 2. Bicycle and pedestrian facility closures will be scheduled outside of peak traffic hours (7:00 – 10:00 a.m. and 3:00 – 6:00 p.m.) to the maximum extent practicable. 3. Public transit access and routes will be maintained in the vicinity of the work site. If public transit will be affected by temporary road closures and require detours, affected transit authorities will be consulted and kept informed of project activities. 4. Adequate parking will be provided or designated public parking areas will be used for maintenance-related vehicles not in use through the maintenance period. 5. Access to driveways and private roads will be maintained. If brief periods of maintenance would temporarily block access, property owners will be notified prior to maintenance activities.

BMP Number	BMP Title	BMP Description
Cultural Resources		
GEN-40	Discovery of Cultural Remains or Historic or Paleontological Artifacts	Work in areas where remains or artifacts are found will be restricted or stopped until proper protocols are met. 1. Work at the location of the find will halt immediately within 50 feet of the find. A "no work" zone shall be established utilizing appropriate flagging to delineate the boundary of this zone, which shall measure at least 50 feet in all directions from the find. 2. The District shall retain the services of a Consulting Archaeologist or Paleontologist, who shall visit the discovery site as soon as practicable, and perform minor hand-excavation to describe the archaeological or paleontological resources present and assess the amount of disturbance. 3. The Consulting Archaeologist shall provide to the District and the Corps, at a minimum, written and digital-photographic documentation of all observed materials, utilizing the guidelines for evaluating archaeological resources for the California Register of Historic Places (CRHP) and National Register of Historic Places (NRHP). Based on the assessment, the District and Corps shall identify the CEQA and Section 106 cultural-resources compliance procedure to be implemented. 4. If the find appears to not meet the CRHP or NRHP criteria of significance, and the Corps archaeologist concurs with the Consulting Archaeologist's conclusions, construction shall continue while monitored by the Consulting Archaeologist. The authorized maintenance work shall resume at the discovery site only after the District has retained a Consulting Archaeologist to monitor and the Watershed Manager has received notification from the Corps to continue work. 5. If the find appears significant, avoidance of additional impacts is the preferred alternative. The Consulting Archaeologist shall determine if adverse impacts to the resources can be avoided. 6. When avoidance is not practical (e.g., maintenance activities cannot be deferred or they must be completed to satisfy the SMP objective), the District shall develop an Action Plan and submit it to the Corps within 48 hours of Consulting Archaeologist's evaluation of the discovery. The action Plan may be submitted via e-mail to ~~(~~rstradford@spd.usace.army.mil~~)~~. The Action Plan is synonymous with a data-recovery plan. It shall be prepared in accordance with the current professional standards and State guidelines for reporting the results of the work, and shall describe the services of a Native American Consultant and a proposal for curation of cultural materials recovered from a non-grave context. 7. The recovery effort will be detailed in a report prepared by the archaeologist in accordance with current archaeological standards. Any non-grave artifacts will be placed with an appropriate repository. 8. The Consulting Paleontologist will meet the Society for Vertebrate Paleontology's criteria for a "qualified professional paleontologist" (Society of Vertebrate Paleontology Conformable Impact Mitigation Guidelines Committee 1995). 9. The paleontologist will follow the Society for Vertebrate Paleontology's guidelines for treatment of the artifact. Treatment may include preparation and recovery of fossil materials for an appropriate museum or university collection, and may include preparation of a report describing the finds. The District will be responsible for ensuring that paleontologist's recommendations are implemented. 10. In the event of discovery of human remains (or the find consists of bones suspected to be human), the field crew supervisor shall take immediate steps to secure and protect such remains from vandalism during periods when work crews are absent.) 11. Immediately notify the Santa Clara County Coroner and provide any information that identify the remains as Native American. If the remains are determined to be from a prehistoric Native American, or determined to be a

BMP Number	BMP Title	BMP Description
		Native American from the ethnographic period, the Coroner shall contact the Native American Heritage Commission (NAHC) within 24 hours of being notified of the remains. The NAHC then designates and notifies within 24 hours a Most Likely Descendant (MLD). The MLD has 24 hours to consult and provide recommendations for the treatment or disposition, with proper dignity, of the human remains and grave goods. 12. Preservation in situ is the preferred option. Human remains shall be preserved in situ if continuation of the maintenance work, as determined by the Consulting Archaeologist and MLD, will not cause further damage to the remains. The remains and artifacts shall be documented and the find location carefully backfilled (with protective geo-fabric if desirable) and recorded in District project files. 13. Human remains or cultural items exposed during maintenance that cannot be protected from further damage shall be exhumed by the Consulting Archaeologist at the discretion of the MLD and reburied with the concurrence of the MLD in a place mutually agreed upon by all parties.
GEN-41	Review of Projects with Native Soil	A cultural resources specialist will conduct a review and evaluation of those sites that would involve disturbance / excavation of native soil previously undisturbed by contemporary human activities to determine their potential for affecting significant cultural resources. The evaluation of the potential to disturb cultural resources will be based on an initial review of archival information provided by the California Historical Resources System/Northwest Information Center (CHRIS/NWIC) in regard to the project area based on a 0.25 mile search radius. It is recommended that this initial archival review be completed by a professional archaeologist who will be able to view confidential site location data and literature to arrive at a preliminary sensitivity determination. If necessary, a further archival record search and literature review (including a review of the Sacred Lands Inventory of the Native American Heritage Commission); and a field inventory of the project area will be conducted to determine the presence/absence of surface cultural materials associated with either prehistoric or historic occupation. The results along with any mitigation and/or management recommendations would be presented in an appropriate report format and include any necessary maps, figures, and correspondence with interested parties. A summary table indicating appropriate management actions (e.g., monitoring during construction, presence/absence testing for subsurface resources; data recovery, etc.) will be developed for each project site reviewed. The management actions will be implemented on site to avoid significant effects to cultural resources.

BMP Number	BMP Title	BMP Description
Utilities		
GEN-42	Investigation of Utility Line Locations	An evaluation of the locations of utility lines that could be affected by maintenance activities will be conducted annually as part of the preparation of the Notice of Proposed Work (NPW). Utilities will be avoided as much as possible. For maintenance areas with the potential for adverse effects on utility services, the following measures shall be implemented: 1. Utility excavation or encroachment permits shall be required from the appropriate agencies. These permits include measures to minimize utility disruption. The District and its contractors shall comply with permit conditions. Such conditions shall be included in construction contract specifications. 2. Utility locations shall be verified through a field survey (potholing) and use of the Underground Service Alert services. 3. Detailed specifications shall be prepared as part of the design plans to include procedures for the excavation, support, and/or fill of areas around utility cables and pipelines. All affected utility services shall be notified of the District's maintenance plans and schedule. Arrangements shall be made with these entities regarding protection, relocation, or temporary disconnection of services. 4. Residents and businesses in the project area shall be notified of planned utility service disruption 2 to 4 days in advance, in conformance with state standards. 5. Disconnected cables and lines shall be reconnected promptly.

B. SECTION C – Sediment Removal BMPs

This group of BMPs is intended to be implemented specifically during sediment removal activities~~. T~~to avoid potential impacts on biological resources~~, none of these measures will be implemented until authorization from the SMP Implementation Project Manager is received~~.

BMP Number	BMP Title	BMP Description
SED-1	Groundwater Management	If high levels of groundwater (i.e., visible water) are encountered during excavations in a work area, the water will be pumped out of the work site or left within the work area if the work activity is not causing water quality degradation in a live stream. Water Quality monitoring would need to occur. If necessary to protect water quality, the extracted water will be discharged into specifically constructed infiltration basins, holding ponds, or areas with vegetation to remove sediment prior to the water re-entering a creek. Water discharged into vegetated areas or swales will be pumped in a manner that will not create erosion around vegetation.
SED-2	Prevent Scour Downstream of Sediment Removal	Sediment removal sites in the transport zone on alluvial fans may cause increased scour downstream if they experience scouring flows or rapid sediment accumulation after maintenance. After sediment removal, the channel will be graded so that the transition between the existing channel both upstream and downstream of the maintenance area is smooth and continuous between the maintained and non-maintained areas and does not present a sudden vertical transition (wall of sediment) or other blockage that could erode once flows are restored to the channel.
SED-3	Restore Channel Features	Low-flow channels within non-tidal streams will be contoured to facilitate fish passage and will emulate the pre-construction conditions as closely as possible, within the finished channel topography.
SED-4	Berm Bypass	Where sediment removal is accomplished without a bypass by removing alternating cells, the berm between the

BMP Number	BMP Title	BMP Description
		work and the live channel will be wide enough to prevent introduction of turbid water from the cell into the live channel.

C. SECTION D – Vegetation Management BMPs

These BMPs provide specific and detailed guidance on the variety of vegetation management procedures implemented by the District. BMPs for the following maintenance techniques are included: tree pruning, tree removal, plant removal, woody debris management, herbicide application, mowing, discing, flaming, and grazing. Practices will be implemented by fully trained and qualified field crews.

BMP Number	BMP Title	BMP Description
VEG-1	Minimize Local Erosion Increase from In-channel Vegetation Removal	To minimize the potential effect of localized erosion, the toe of the bank will be protected by leaving vegetation to the maximum extent possible and consistent with the maintenance guidelines or original design requirements.
VEG-2	Non-native Invasive Plant Removal	Invasive species (e.g. cape ivy [*Delairea odorata/Senecio mikanoides]*, arundo [*Arundo donax*]) will be disposed of in a manner that will not contribute to the further spread of the species. Cape ivy removed during a project shall be bagged and disposed of in a landfill. Arundo canes will be prevented from floating downstream or otherwise entering the creek or waterway.
VEG-3	Use Appropriate Equipment for Instream Removal	When using heavy equipment to cut or remove instream vegetation, low ground pressure equipment, such as tracked wheels will be utilized to reduce impacts to the streambed.
VEG-4	Use Flamers with Caution	1. A fire extinguisher, water supply and other appropriate fire suppression equipment will always be kept close to the work site in case of an emergency. 2. Propane tanks will be checked for leaks and proper functioning prior to and proceeding use of flaming equipment. The propane tank will be treated as a hazardous material.
VEG-5	Conduct Flaming During Appropriate Weather and Seasonal Conditions	Flamers will not be used during periods of high fire danger or in areas where fuel or climate conditions could accidentally ignite a fire.
VEG-6	Standard Grazing Procedures	1. Vegetation and areas to be preserved will be fenced off to exclude grazing animals. 2. Grazing animals will be excluded from stream channels, using fencing or other barriers.

D.

E. SECTION E – Bank Stabilization BMPs

These BMPs provide additional guidance during implementation of bank stabilization projects, ~~. T~~to avoid impacts on biological and cultural resources~~, none of these measures will be implemented until authorization from the SMP Implementation Project Manager is received~~. Review of

the Post-Project Restoration BMPs in Section F is recommended because those measures will be implemented after bank stabilization projects are complete. The BMPs included in this section are implemented by the field crew and site manager.

BMP Number	BMP Title	BMP Description
BANK-1	Bank Stabilization Design to Prevent Erosion Downstream	To further prevent potential downstream erosion impacts due to bank stabilization, the site design will be adjusted to provide proactive protection of vulnerable areas within the reach of the worksite. Such measures include, but are not limited to, appropriately keyed-in coir logs, riparian planting, strategic placement of rock, and flow deflectors. Bank stabilization will include appropriate transition designs upstream and downstream of the work site to prevent potential erosion impacts.
BANK-2	Concrete Use Near Waterways	Concrete that has not been cured is alkaline and can increase the pH of the water.~~;~~ ~~f~~Fresh concrete will be isolated until it no longer poses a threat to water quality using the following appropriate measures: 1. Wet sacked concrete will be excluded from the wetted channel for a period of two weeks after installation. During that time, the wet sacked concrete will be kept moist (such as covering with wet carpet) and runoff from the wet sacked concrete will not be allowed to enter a live stream. 2. Poured concrete will be excluded from the wetted channel for a period of two weeks after it is poured. During that time, the poured concrete will be kept moist, and runoff from the wet concrete will not be allowed to enter a live stream. Commercial sealants (e.g., Deep Seal, Elasto-Deck Reservoir Grade) may be applied to the poured concrete surface where difficulty in excluding water flow for a long period may occur. If a sealant is used, water will be excluded from the site until the sealant is dry. 3. Dry sacked concrete will not be used in any channel. 4. An area outside of the channel and floodplain will be designated to clean out concrete transit vehicles.
BANK-3	Bank Stabilization Post-Construction Maintenance	The District may maintain or repair bank stabilization projects that are less than 2 years old that are damaged by winter flows. The District will notify the regulatory agencies 24 hours prior to beginning the work and the work will be reported as part of the Post-Construction Report submitted by January 15 of each year or if necessary, the subsequent year. Appropriate BMPs will be applied during maintenance repairs.

F.

G. SECTION F – Post-Project Restoration BMPs

These BMPs will be implemented, as appropriate, on all sites that involve ground disturbance.

BMP Number	BMP Title	BMP Description
REVEG-1	Seeding	Sites where maintenance activities result in exposed soil will be stabilized to prevent erosion. Disturbed areas shall be seeded with native seed as soon as is appropriate after maintenance activities are complete. An erosion control seed mix may be applied to exposed soils, and down to the ordinary high water mark (OHWM). 1. The seed mix should consist of California native grasses (e.g., *Hordeum brachyantherum*, *Elymus glaucus*, and *Vulpia microstachyes*) or annual, sterile seed mix. 2. Temporary earthen access roads may be seeded when site and horticultural conditions are suitable, or have other appropriate erosion control measures in place (GEN-20).
REVEG-2	Planting Material	Revegetation and replacement plantings will consist of locally collected native species. Species selection will be based on surveys of natural areas on the same creek that have a similar ecological setting and/or as appropriate for the site location.

H. SECTION G – Management of Animal ~~Damage~~ Conflict BMPs

Methods of animal management included in the SMP are avoidance, biological controls, physical alterations, habitat alterations, and lethal controls. Of all these methods, implementation of lethal controls has the highest potential for environmental and biological impacts. Therefore, the animal management BMPs provided in this section focus on lethal controls. The application area for lethal controls will be identified during the annual planning process (see the Biological Resource Planning BMPs) and guided as directed by wildlife biologists. Species habitat areas are defined by the District's GIS species mapping, updated CNDDB and known local biological information and are included in the SMP Update Subsequent EIR.

BMP Number	BMP Title	BMP Description
ANI-1	Avoid Redistribution of Rodenticides	Carcass surveys will be conducted periodically when acute poisons and first generation anticoagulants are used. The frequency of the carcass surveys will be specific to the type of rodenticide used,~~. In areas where first generation rodenticides are used, carcass retrieval surveys will be conducted as follows~~ to minimize secondary poisoning impacts: • Acute toxins – Daily carcass surveys, beginning the first day after application until the end of the baiting period for acute toxins used above-ground . • Anticoagulants ~~- Weekly for anticoagulants~~Within 7 days of installation of first generation anticoagulant bait, and weekly thereafter. Anytime a carcass is found, daily carcass surveys will begin for as long as carcasses are found until no carcasses are found during a daily survey. Once no carcasses are found, carcass surveys will return to the weekly carcass survey timeline maximum from the date of initial installation of an anticoagulant bait station. ~~. In addition, twice per year District biologists will conduct daily carcass surveys for a full cycle of a baiting trap. to minimize secondary poisoning impacts.~~ To verify that the frequency of carcass surveys is adequate, a biologist will conduct daily carcass surveys 2 times per year over one baiting cycle. Based on the results of these surveys,

BMP Number	BMP Title	BMP Description
		the timing of carcass surveys will be adjusted if necessary. Any spilled bait will be cleaned up immediately.
ANI-2	Prevent Harm to the Salt Marsh Harvest Mouse and California Clapper Rail	1. No rodenticides or fumigants will be used within the range of the SMHM or CCR as identified on District range maps. 2. Methods of rodent control within SMHM or CCR habitat will be limited to live trapping. All live traps shall have openings measuring no smaller than 2 inches by 1 inch to allow any SMHM that inadvertently enter the trap to easily escape. All traps will be placed outside of pickleweed areas and above the high tide line.
ANI-3	Burrowing Owl, Bald Eagle and Golden Eagle Buffer Zone	Per the California Department of Fish and Game's 2008 *Guidance for Burrowing Owl Conservation*, a 656-yard buffer will be established around known burrowing owl locations where no rodenticides or fumigants (including smoke bombs) will be used. A 0.5-mile buffer will be established around known bald eagle and golden eagle nesting locations where no rodenticides will be used.
ANI-4	Animal Control in Sensitive Amphibian Habitat	1. Fumigants will not be used within the habitat areas of special status amphibians. 2. The use of bait stations within the potential habitat areas of California red-legged frog, California tiger salamander, or foothill yellow-legged frog will be limited to bait stations specifically designed to prevent entry by these species. 3. Any live traps will allow California red-legged frogs, California tiger salamanders, or foothill yellow-legged frogs to safely exit (e.g., by having openings measuring no smaller than 2 inches by 1 inch).
ANI-5	Slurry Mixture near Waterways	All slurry type mixes used to fill rodent burrows will be prevented from entering any waterway by using appropriate erosion control methods and according to the manufacturer's specifications. If the creek bed is dry or has been dewatered, any material that has entered the channel will be removed.

I. SECTION H – Use of Pesticides

Pesticides may be used for vegetation management or control of animal damage

BMP Number	BMP Title	BMP Description
HM-4	Posting and Notification for Pesticide Use	Posting of areas where pesticides are used will be performed in compliance with District Policy Ad-8.2 Pesticide Use as follows: 1. Posting will be performed in compliance with the label requirements of the product being applied. 2. In addition, posting will be provided for any products applied in areas used by the public for recreational purposes, or those areas readily accessible to the public, regardless of whether the label requires such notification. In doing this, the District ensures that exposure risk is minimized further by adopting practices that go beyond the product label requirements. (The posting method may be modified to avoid destruction of bait stations or scattering of rodenticide.) 3. These postings will notify staff and the general public of the date and time of application, the product's active ingredients, and common name, and the time of allowable re-entry into the treated area. 4. Signs will not be removed until after the end of the specified re-entry interval.

BMP Number	BMP Title	BMP Description
		5. Right-to-know literature on the product will be made available to anyone in the area during the re-entry period. 6. A District staff contact phone number will be posted on the sign, including a ~~pager~~cellular phone number. 7. Notification of pesticide activities will be made as required by law. Also, the District will maintain records of neighbors with specific needs relative to notification before treatment of an adjacent area so that such needs are met.

Source: Data compiled by Horizon Water and Environment in 2011

ATTACHMENT G

Sediment Characterization Plans
Regional Water Quality Control Boards
Central Coast and
San Francisco Bay

SEDIMENT CHARACTERIZATION PLAN

FOR THE
SANTA CLARA VALLEY WATER DISTRICT
MULTI-YEAR STREAM MAINTENANCE PROGRAM
-CENTRAL COAST REGION-

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November 2011

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Introduction

The Santa Clara Valley Water District (District) conducts sediment removal, vegetation management, bank protection repairs, minor maintenance, and canal maintenance activities in channels/creeks for the purpose of alleviating the potential for local flooding problems and to meet the requirements of the Federal Emergency Management Agency for flood protection. Under the aforementioned activities of the Multi-Year Stream Maintenance Program (SMP), channel/creek sediment is often removed as a result of these activities. In order to effectively manage the removal and disposal of the sediments removed as a result of these activities, it is necessary to characterize the chemical and physical properties of the sediments (or also known as creek material as some of the tested material is from the creek banks or stockpiles, etc.). This characterization allows the District to (1) effectively plan for disposal of the sediments and (2) assist with determining the best management practices (BMP) to implement in order to avoid and minimize impacts to water quality, aquatic life, and beneficial uses. The sediment characterization plan proposed for the District's Multi-Year Stream Maintenance Program, as presented herein, is a result of the District's sediment testing and evaluation effort, and continuous improvement process based on guidance from regulatory agencies and other stakeholders, since 1997.

Purpose

According to the Basin Plan, the Regional Board establishes and enforces Waste Discharge Requirements (WDR) for point and nonpoint source of pollutants at levels necessary to meet numerical and narrative water quality objectives. The sediment tests performed by the District each year, as part of its SMP based on the historic occurrence of pollutants within Santa Clara Valley streams, in accordance with the Basin Plan water quality objectives, and the Regional Board's WDR through a stakeholder process. The stakeholder process and lessons learned meetings involved participation of the Regional Board, the California State Department of Fish and Game (DFG), the U.S. Environmental Protection Agency (EPA), the U.S. Army Corps of Engineers (Corps), and various environmental organizations which assisted the District in continuous evaluation and improvement of the sediment characterization plan.

There are four main reasons for characterizing the sediments described as follows:

Landfill Acceptance

Landfills require creek sediment to be characterized before they accept the material for disposal.

Reuse Sites

Reuse sites are considered places that are not within the immediate vicinity (within 500 feet upstream or downstream) of the sediment excavation. These places can range from (but are not limited to) ponds, creek banks, or maintenance roads. These reuse sediments are approved by the Regional Board in advance of placement of the material. Material reused within the 500 feet upstream or downstream, and less than 500 cubic yards, is done without sediment testing.

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The Central Coast Bay Regional Water Quality Control Board

The Regional Board has required characterization of the materials to determine if the proposed disposal method is acceptable. The Regional Board must ensure that the disposal of the material will not pose a threat to the waters of the state. The Regional Board is interested in determination of total mercury and polychlorinated biphenyls (PCB's) in residual sediment after sediment removal.

The California Department of Fish and Game

DFG requests that the materials be characterized to determine if they will adversely impact fish and wildlife as the removal operations may cause sediments to be re-suspended and migrate downstream where it may have an impact on fish and wildlife. DFG defers to the Water Board for the determination of suitability for creek material removal.

Scope

Under the SMP, sediment will only be tested using the San Francisco Bay Regional Water Quality Control Board's (Regional Board) Benificail Reuse of Dredged Materials (for consistency with the San Francisco Board): Sediment Screening and Testing Guidelines (May 2000) to facilitate any beneficial reuse of sediment generated by the District at its proposed. The physical and chemical properties of sediments tested by the District include metals, pesticides and organophosphorous compounds, polychlorinated biphenyls, polynuclear aromatic hydrocarbons, moisture content, chloride, pH, total sulfides, ammonia, and toxicity (in some cases).

This sampling plan documents sampling and analytical procedures which will be utilized for the creek sites under the SMP. It is not intended to be a full characterization of all the stream sediments. The Sediment Characterization Plan is primarily designed to characterize sediment designated for removal (using composite, continuous core and residual sediment sampling methods). Residual sediment samples will only be collected in an attempt to characterize the sediment that may be subject to erosion and transport during flows.

The Sediment Characterization Plan addresses the following sampling methods designed to meet the overall objectives of landfill acceptance, sediment reuse at alternative sites, water quality protection, and fish and wildlife protection:

1. Composite sediment sampling
2. Continuous Core sampling
3. Residual sediment sampling

Objectives

The specific objectives of the Sediment Characterization Plan are as follows:

1. Characterize the sediments for acceptance by landfills.

2. Characterize the sediments to determine their suitability for reuse at alternative disposal sites (i.e., non-landfill reuse sites).

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3. Compliance with regulatory requirements for the sediment removal activities.

4. Provide data for evaluation of the feasibility of long-term disposal, reuse, and recycling opportunities for sediment generated by the District.

Sampling Methods

This section describes the frequency of sampling and the location of sample collection at the SMP sites involving sediment removal activities. From both the regulatory and scientific perspectives, the primary objectives of a sampling plan for a solid material are twofold: namely, (1) to collect samples that are representative samples as exhibiting average properties of the whole solid material and (2) to collect samples that will allow measurements of the chemical properties of the waste that are both accurate and precise.

Sediment samples will be collected for characterization of sediment designated for removal and analyzed in accordance with the contaminants listed on Table 4 Recommended Sediment Chemistry Screening Guidelines for Beneficial Reuse of Dredged Material (Re-use Guidelines) from the (SF) Regional Boards Basin Plan. Sampling parameters/analytes listed in Table 4 may be modified after a history of sampling is obtained. This may result in not requiring monitoring for some of these contaminants under certain situations or at certain locations, or adding more parameters/analytes if deemed necessary by the Executive Officer of the Regional Board.

Reliable information concerning the chemical properties of a solid waste is needed for the purpose of comparing chemical properties with applicable regulatory thresholds. For chemical information to be reliable, it must be accurate and precise. Accuracy is usually achieved by incorporating some form of randomness into the selection process for the samples that generate the data. Precision is most often obtained by selecting an appropriate number of samples.

For this Sediment Characterization Plan, the District will utilize a systematic random sampling technique generated by the sediment sampling database, in which all sampling points from a population are randomly selected. The advantages of systematic random sampling over other sampling techniques are the ease with which samples are identified, and collected, an increase in precision, and to collect representative data on chemical properties. All samples shall be collected in accordance with the U.S. EPA Guidelines and sampling methodologies. The methods of analyses and detection limits must be appropriate for the expected concentrations. Specific methods of analyses must be identified. If methods other than U.S. EPA – approved methods of Standard Methods are used, the exact methodology must be submitted for review and approved by the Executive Officer of the Regional Board.

Composite Sediment Samples

The purpose of composite sediment sampling is to conduct the widest range of characterization along the project sites' lengths and widths in order to capture the most variation of the area. This broader scope of randomly generated 4 point sampling will give a greater sense of the variability of the channel material than a specific sample point.

Composite Sample Collection Frequency

In order to characterize the sediment, one composite, which consists of 4 random

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samples, in-situ sample shall be collected and analyzed approximately every 4,000 cys. Approximately one sample shall be collected every 1,000 cys. These samples will be composited together by the laboratory. The length of the channel is also taken into consideration as the District's database will generate sampling points based on the length of the project area. As such, projects with long project lengths will have sample points farther apart in order to better characterize the variability in sediment contaminants along the entire length of the worksite.

Composite Sample Locations

The location of each sample at the Sediment Removal Program sites must be selected in the following three dimensions: (1) the creek station, or the location along the length of the creek; (2) the location along the creek cross section; and (3) the depth below ground surface (bgs). With these parameters, a sample point is randomly generated. The rationale for selection of a sampling location in all three dimensions is described below:

Composite Sample Depth

The sampling depth of the composite samples are also randomly generated varied from surface sampling to maximum excavation depth of the proposed project.

Continuous Core Sediment Samples

The purpose of continuous core sampling is to take samples at selected locations (e.g. below outfalls, depression areas of the creek, likely contaminated areas) where the highest likelihood of contamination exists in the project site. This type of sample is not taken on the banks (above the toe of the channel) nor from stockpiles, only from within toe to toe of the channel.

Continuous Core Sample Collection Frequency

One continuous core sample is taken every 4000 cubic yards per project site.

Continuous Core Sample Locations

The location of the sample is determined in the field upon attempting to locate areas of depression or outfalls within the project site. As these features are not always apparent, the location will sometimes have to be placed in the most likely areas of these features.

Continuous Core Sample Depth

The depth of the sample is randomly generated by the District's sediment sampling database and printed on the sediment sampling plan generated in the office and used out in the field.

Residual Sediment Samples

The purpose of residual sediment sampling is to conduct limited characterization of sediment left behind after sediment removal from earthen channels and creeks. The exposed sediment in the channel/creek bottom will be sampled and analyzed for total mercury and PCB.

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Residual Sample Collection Frequency

Residual sediment samples will be collected at one every 4000 cys on earthen channels.

Residual Sample Locations

This type of sample will be collected at each earthen channel/creek site. The location of the residual sample will coincide with the continuous core sample.

Residual Sample Depth

The samples will be collected from within 1 foot below the planned maximum depth of excavation for that project.

Sampling Procedures

This section describes the field sampling procedures. All samples shall be collected in accordance with U.S. EPA Guidelines and sampling methodologies. The methods of analyses and detection limits must be appropriate for expected concentrations. Specific methods of analyses must be identified. If methods other than U.S. EPA approved methods of Standard Methods are used, the exact methodology must be submitted for review and approved by the Executive Officer.

Sample Collection

All samples shall be collected by means of a hand trowel, a hand auger, or another sampling method approved by the regulatory agencies. The individual collecting the sample will have the discretion of choosing the sampling method which is the most efficient to perform.

Sampling will be conducted in accordance with the methods described below:

Hand Trowel Procedure

1. Remove vegetation and woody debris from the ground surface.
2. If collecting a subsurface sample, use a shovel to dig down to the desired sampling interval.
3. Use a stainless-steel hand trowel to collect soil.
4. Place soil in an appropriate sampling container.
5. Replace all excavated soils to their original location (i.e., backfill the sampling hole).

Hand Auger Procedure

1. Remove vegetation and woody debris from the ground surface.
2. Use the hand auger to advance down to the top of the sampling interval.

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3. Use a hand auger to collect soil from the desired depth.

4. Use a clean (decontaminated) tool to scoop the soil out of the auger and place in an appropriate sampling container.

5. Replace all excavated soils to their original location (i.e., backfill the sampling hole).

6. If hand auger refusal is encountered, sample will be collected from an alternate location.

Sample Containers and Sample Volumes

All samples shall be collected using wide-mouthed glass jars or other sampling containers as directed or supplied by the laboratory.

Sampling volume and number of containers necessary shall be specified by the District's contract of internal laboratory. It is anticipated that multiple containers of sediment will need to be collected at each location.

Decontamination Procedures

All equipment used to collect soil samples (hand trowel or hand auger) shall be decontaminated prior to collecting each sample, on-site. Equipment shall be decontaminated by at least rinsing the equipment twice with water, drying and then visually inspecting to ensure that there are no residual particles from the previous sample. The final rinse shall be with de-ionized or distilled water.

Sample Preservation

All samples shall be immediately preserved in accordance with the EPA sampling and testing procedures. This is most commonly done by placing the samples in an insulated cooler with ice. Samples may also be stored in a refrigerator.

The laboratory shall immediately record the temperature of the sample containers upon receipt of the samples, if required by the EPA sampling and testing procedures for the contaminants that are being analyzed.

Chain of Custody Procedures

Standard chain of custody procedures shall be used throughout the sampling collection procedures. A chain of custody shall be prepared for all samples. Each individual who has responsibility for the samples is required to sign the chain of custody upon relinquishing the samples to another party. The receiving party taking custody of samples shall also sign the chain of custody form.

When in the field, samples shall always be in sight of the individual responsible for the samples, or the samples shall be stored within a locked vehicle. If the samples are stored in an office prior to delivery to the laboratory, the samples shall be stored in a secure location. Applicable sample storage and preservation procedures shall be followed.

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Survey of Sampling Locations

All sampling locations will be identified by Geographic Information Stationing.

Analytical Procedures

Every sediment sample location shall be sampled for the full list of parameters/analytes listed in Table 4 for the Reuse Guidelines. Sampling parameters/analytes listed in Table 4 may be modified after a history of sampling is obtained. This may result in not requiring monitoring for some of these contaminants under certain situations or at certain locations, or adding more parameters/analytes if deemed necessary by the Executive Officer.

Rational for Analytical Test Method Selection

The rationale used for selecting test methods is based largely on the laboratory's ability to meet the detection limit requirements of the Table 4. All methods are EPA standards but may vary from time to time (based on changes from the EPA). Although, the driving force behind the selection of the test methods will be (SF) Regional Board's Re-use Guidelines.

Moisture Content

Sediments in creeks naturally contain moisture; moisture content may fluctuate during the year and is dependent on creek flows, groundwater elevation, and other local conditions. The moisture content of in-situ soils will be higher than the moisture content of excavated sediments, due to the natural process of evaporation and infiltration.

Analysis of moisture content is required for Class III landfill acceptance for wet soils. In addition, it is necessary to measure the moisture content in order to determine the dry weight concentrations of constituents within the sediment.

Selected Test Method and Frequency of Testing

All samples except residual sediment samples shall be analyzed for moisture content by EPA Method 160.3 or the most current prescribed method.

Toxicity

Creek sediments may be toxic due to nonpoint source pollutants which may have been deposited into the creeks. Toxicity is of concern if the sediment is to be reused. Sediment toxicity test will be conducted only on composite samples from sites where the waters may not be controlled during sediment removal operations due to tidal action; therefore toxicity sampling shall only be conducted on sediment removal projects which would not divert the water around the project site during excavation.

Selected Test Method and Frequency of Testing

All samples in tidal areas only, except residual sediment samples, shall be tested for toxicity by means of a toxicity screening bioassay, by the test method specified in California Code of Regulations, Title 22. The samples will be tested using Eohaustorius estuarius species, unless otherwise specified by the EPA.

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Methyl-Mercury Testing

Past mining operations allowed mining tailing and debris discharge to some creeks and this has increased mercury levels in sediments and soils in those watersheds, specifically the Guadalupe Watershed.

Selected Test Method and Frequency of Testing

Only the following creeks will be required to have the additional analysis of methyl mercury be performed for all composite samples, in accordance with EPA 1630:

Guadalupe Creek
Los Gatos Creek
Alamitos Creek
Randol Creek.

Quality Control

A QA/QC plan is an important component of a monitoring program involving extensive field sampling and laboratory analyses. The two objectives of the QA/QC plan are: 1) to provide a means of ongoing control and evaluation of the sampling and analysis procedures; and 2) to quantify data precision and accuracy for use in data interpretation. Duplicate samples are no longer required. The QA/QC plan will be followed in all phases of the monitoring program including sampling and validation reporting. QA/QC requirements are noted below.

The District will utilize a sampling contractor or internal staff to conduct field sampling. The assigned field staff and/or contractor will be responsible for managing all field sampling equipment. The actual assignment of sampling areas and analysis are given to the sampling staff by the Stream Maintenance Program Project Manager (PM). Verification of equipment, analysis, chain of custodies, etc. will also be conducted by the PM.

All equipment used for field sampling will be kept in good working order and if required will be tested and/or calibrated before leaving the office. Verification of working order/calibration (if necessary) should be re-verified, visually, upon arrival at the site to ensure the instruments are in proper working condition.

Laboratory

Whichever laboratory is used to perform analysis under this sediment sampling plan, they must be certified by the State of California Department of Health Services under the Environmental Laboratory Accreditation Program. For sub-labs that are out of state, they must hold current certification in their state's accreditation program. Further, the contract lab is required to perform their own quality control tests with the results published in the final lab report.

Reporting

Upon receipt of the analytical results from the laboratory, the District will submit the results to the Regional Board for review and approval. This will happen in the following manner:

The District shall attempt compile the results in 2 to 3 submittals to the Regional Board

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1. For ease of review, only the contaminants that test above the Regional Board's Table 4 detection limits will be reported to the reviewing staff member of the Regional Board
2. The entirety of the results, for detected and non-detected, shall be maintained in the District's database and made available upon request. Further, the signed lab copy of the results shall be maintained for no less than 3 years by the District

3. The Regional Board shall review the detected contaminants and approve them for excavation and reuse. For project site sediments that are going to landfill, the Regional Board is only required to approve the removal of the material as the landfill will approve acceptance to their disposal facility.

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SEDIMENT CHARACTERIZATION PLAN

FOR THE
SANTA CLARA VALLEY WATER DISTRICT
MULTI-YEAR STREAM MAINTENANCE PROGRAM
-SAN FRANCISCO REGION-

Revised by

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Under the Direction of

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November 2011

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Introduction

The Santa Clara Valley Water District (District) conducts sediment removal, vegetation management, bank protection repairs, minor maintenance, and canal maintenance activities in channels/creeks for the purpose of alleviating the potential for local flooding problems and to meet the requirements of the Federal Emergency Management Agency for flood protection. Under the aforementioned activities of the Multi-Year Stream Maintenance Program (SMP), channel/creek sediment is often removed as a result of these activities. In order to effectively manage the removal and disposal of the sediments removed as a result of these activities, it is necessary to characterize the chemical and physical properties of the sediments (or also known as creek material as some of the tested material is from the creek banks or stockpiles, etc.). This characterization allows the District to (1) effectively plan for disposal of the sediments and (2) assist with determining the best management practices (BMP) to implement in order to avoid and minimize impacts to water quality, aquatic life, and beneficial uses. The sediment characterization plan proposed for the District's Multi-Year Stream Maintenance Program, as presented herein, is a result of the District's sediment testing and evaluation effort, and continuous improvement process based on guidance from regulatory agencies and other stakeholders, since 1997.

Purpose

According to the Basin Plan, the Regional Board establishes and enforces Waste Discharge Requirements (WDR) for point and nonpoint source of pollutants at levels necessary to meet numerical and narrative water quality objectives. The sediment tests performed by the District each year, as part of its SMP are based on the historic occurrence of pollutants within Santa Clara Valley streams, in accordance with the Basin Plan water quality objectives, and the Regional Board's WDR through a stakeholder process. The stakeholder process and lessons learned meetings involved participation of the Regional Board, the California State Department of Fish and Game (DFG), the U.S. Environmental Protection Agency (EPA), the U.S. Army Corps of Engineers (Corps), and various environmental organizations which assisted the District in continuous evaluation and improvement of the sediment characterization plan.

There are four main reasons for characterizing the sediments described as follows:

Landfill Acceptance

Landfills require creek sediment to be characterized before they accept the material for disposal.

Reuse Sites

Reuse sites are considered places that are not within the immediate vicinity (within 500 feet upstream or downstream) of the sediment excavation. These places can range from (but are not limited to) ponds, creek banks, or maintenance roads. These reuse sediments are approved by the Regional Board in advance of placement of the material. Material reused within the 500 feet upstream or downstream, and less than 500 cubic yards, is done without sediment testing.

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The San Francisco Bay Regional Water Quality Control Board

The Regional Board has required characterization of the materials to determine if the proposed disposal method is acceptable. The Regional Board must ensure that the disposal of the material will not pose a threat to the waters of the state. The Regional Board is interested in determination of total mercury and polychlorinated biphenyls (PCB's) in residual sediment after sediment removal.

The California Department of Fish and Game

DFG requests that the materials be characterized to determine if they will adversely impact fish and wildlife as the removal operations may cause sediments to be re-suspended and migrate downstream where it may have an impact on fish and wildlife. DFG defers to the Water Board for the determination of suitability for creek material removal.

Scope

Under the SMP, sediment will only be tested using the San Francisco Bay Regional Water Quality Control Board's (Regional Board) Benificail Reuse of Dredged Materials: Sediment Screening and Testing Guidelines (May 2000) to facilitate any beneficial reuse of sediment generated by the District. The physical and chemical properties of sediments tested by the District include metals, pesticides and organophosphorous compounds, polychlorinated biphenyls, polynuclear aromatic hydrocarbons, moisture content, chloride, pH, total sulfides, ammonia, and toxicity (in some cases).

This sampling plan documents sampling and analytical procedures which will be utilized for the creek sites under the SMP. It is not intended to be a full characterization of all the stream sediments. The Sediment Characterization Plan is primarily designed to characterize sediment designated for removal (using composite, continuous core and residual sediment sampling methods). Residual sediment samples will only be collected in an attempt to characterize the sediment that may be subject to erosion and transport during flows.

The Sediment Characterization Plan addresses the following sampling methods designed to meet the overall objectives of landfill acceptance, sediment reuse at alternative sites, water quality protection, and fish and wildlife protection:

1. Composite sediment sampling
2. Continuous Core sampling
3. Residual sediment sampling

Objectives

The specific objectives of the Sediment Characterization Plan are as follows:

1. Characterize the sediments for acceptance by landfills.

2. Characterize the sediments to determine their suitability for reuse at alternative disposal sites (i.e., non-landfill reuse sites).

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3. Compliance with regulatory requirements for the sediment removal activities.

4. Provide data for evaluation of the feasibility of long-term disposal, reuse, and recycling opportunities for sediment generated by the District.

Sampling Methods

This section describes the frequency of sampling and the location of sample collection at the SMP sites involving sediment removal activities. From both the regulatory and scientific perspectives, the primary objectives of a sampling plan for a solid material are twofold: namely, (1) to collect samples that are representative samples as exhibiting average properties of the whole solid material and (2) to collect samples that will allow measurements of the chemical properties of the waste that are both accurate and precise.

Sediment samples will be collected for characterization of sediment designated for removal and analyzed in accordance with the contaminants listed on Table 4 Recommended Sediment Chemistry Screening Guidelines for Beneficial Reuse of Dredged Material (Re-use Guidelines) from the Regional Boards Basin Plan. Sampling parameters/analytes listed in Table 4 may be modified after a history of sampling is obtained. This may result in not requiring monitoring for some of these contaminants under certain situations or at certain locations, or adding more parameters/analytes if deemed necessary by the Executive Officer of the Regional Board.

Reliable information concerning the chemical properties of a solid waste is needed for the purpose of comparing chemical properties with applicable regulatory thresholds. For chemical information to be reliable, it must be accurate and precise. Accuracy is usually achieved by incorporating some form of randomness into the selection process for the samples that generate the data. Precision is most often obtained by selecting an appropriate number of samples.

For this Sediment Characterization Plan, the District will utilize a systematic random sampling technique generated by the sediment sampling database, in which all sampling points from a population are randomly selected. The advantages of systematic random sampling over other sampling techniques are the ease with which samples are identified, and collected, an increase in precision, and to collect representative data on chemical properties. All samples shall be collected in accordance with the U.S. EPA Guidelines and sampling methodologies. The methods of analyses and detection limits must be appropriate for the expected concentrations. Specific methods of analyses must be identified. If methods other than U.S. EPA – approved methods of Standard Methods are used, the exact methodology must be submitted for review and approved by the Executive Officer of the Regional Board.

Composite Sediment Samples

The purpose of composite sediment sampling is to conduct the widest range of characterization along the project sites' lengths and widths in order to capture the most variation of the area. This broader scope of randomly generated 4 point sampling will give a greater sense of the variability of the channel material than a specific sample point.

Composite Sample Collection Frequency

In order to characterize the sediment, one composite, which consists of 4 random samples, in-situ sample shall be collected and analyzed approximately every 4,000 cys. Approximately one sample shall be collected every 1,000 cys. These

samples will be composited together by the laboratory. The length of the channel is also taken into consideration as the District's database will generate sampling points based on the length of the project area. As such, projects with long project lengths will have sample points farther apart in order to better characterize the variability in sediment contaminants along the entire length of the worksite.

Composite Sample Locations

The location of each sample at the Sediment Removal Program sites must be selected in the following three dimensions: (1) the creek station, or the location along the length of the creek; (2) the location along the creek cross section; and (3) the depth below ground surface (bgs). With these parameters, a sample point is randomly generated. The rationale for selection of a sampling location in all three dimensions is described below:

Composite Sample Depth

The sampling depth of the composite samples are also randomly generated varied from surface sampling to maximum excavation depth of the proposed project.

Continuous Core Sediment Samples

The purpose of continuous core sampling is to take samples at selected locations (e.g. below outfalls, depression areas of the creek, likely contaminated areas) where the highest likelihood of contamination exists in the project site. This type of sample is not taken on the banks (above the toe of the channel) nor from stockpiles, only from within toe to toe of the channel.

Continuous Core Sample Collection Frequency

One continuous core sample is taken every 4000 cubic yards per project site.

Continuous Core Sample Locations

The location of the sample is determined in the field upon attempting to locate areas of depression or outfalls within the project site. As these features are not always apparent, the location will sometimes have to be placed in the most likely areas of these features.

Continuous Core Sample Depth

The depth of the sample is randomly generated by the District's sediment sampling database and printed on the sediment sampling plan generated in the office and used out in the field.

Residual Sediment Samples

The purpose of residual sediment sampling is to conduct limited characterization of sediment left behind after sediment removal from earthen channels and creeks. The exposed sediment in the channel/creek bottom will be sampled and analyzed for total mercury and PCB.

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Residual Sample Collection Frequency

Residual sediment samples will be collected at one every 4000 cys on earthen channels.

Residual Sample Locations

This type of sample will be collected at each earthen channel/creek site. The location of the residual sample will coincide with the continuous core sample.

Residual Sample Depth

The samples will be collected from within 1 foot below the planned maximum depth of excavation for that project.

Sampling Procedures

This section describes the field sampling procedures. All samples shall be collected in accordance with U.S. EPA Guidelines and sampling methodologies. The methods of analyses and detection limits must be appropriate for expected concentrations. Specific methods of analyses must be identified. If methods other than U.S. EPA approved methods of Standard Methods are used, the exact methodology must be submitted for review and approved by the Executive Officer.

Sample Collection

All samples shall be collected by means of a hand trowel, a hand auger, or another sampling method approved by the regulatory agencies. The individual collecting the sample will have the discretion of choosing the sampling method which is the most efficient to perform.

Sampling will be conducted in accordance with the methods described below:

Hand Trowel Procedure

1. Remove vegetation and woody debris from the ground surface.
2. If collecting a subsurface sample, use a shovel to dig down to the desired sampling interval.
3. Use a stainless-steel hand trowel to collect soil.
4. Place soil in an appropriate sampling container.
5. Replace all excavated soils to their original location (i.e., backfill the sampling hole).

Hand Auger Procedure

1. Remove vegetation and woody debris from the ground surface.
2. Use the hand auger to advance down to the top of the sampling interval.

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3. Use a hand auger to collect soil from the desired depth.

4. Use a clean (decontaminated) tool to scoop the soil out of the auger and place in an appropriate sampling container.

5. Replace all excavated soils to their original location (i.e., backfill the sampling hole).

6. If hand auger refusal is encountered, sample will be collected from an alternate location.

Sample Containers and Sample Volumes

All samples shall be collected using wide-mouthed glass jars or other sampling containers as directed or supplied by the laboratory.

Sampling volume and number of containers necessary shall be specified by the District's contract of internal laboratory. It is anticipated that multiple containers of sediment will need to be collected at each location.

Decontamination Procedures

All equipment used to collect soil samples (hand trowel or hand auger) shall be decontaminated prior to collecting each sample, on-site. Equipment shall be decontaminated by at least rinsing the equipment twice with water, drying and then visually inspecting to ensure that there are no residual particles from the previous sample. The final rinse shall be with de-ionized or distilled water.

Sample Preservation

All samples shall be immediately preserved in accordance with the EPA sampling and testing procedures. This is most commonly done by placing the samples in an insulated cooler with ice. Samples may also be stored in a refrigerator.

The laboratory shall immediately record the temperature of the sample containers upon receipt of the samples, if required by the EPA sampling and testing procedures for the contaminants that are being analyzed.

Chain of Custody Procedures

Standard chain of custody procedures shall be used throughout the sampling collection procedures. A chain of custody shall be prepared for all samples. Each individual who has responsibility for the samples is required to sign the chain of custody upon relinquishing the samples to another party. The receiving party taking custody of samples shall also sign the chain of custody form.

When in the field, samples shall always be in sight of the individual responsible for the samples, or the samples shall be stored within a locked vehicle. If the samples are stored in an office prior to delivery to the laboratory, the samples shall be stored in a secure location. Applicable sample storage and preservation procedures shall be followed.

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Survey of Sampling Locations

All sampling locations will be identified by Geographic Information Stationing.

Analytical Procedures

Every sediment sample location shall be sampled for the full list of parameters/analytes listed in Table 4 for the Reuse Guidelines. Sampling parameters/analytes listed in Table 4 may be modified after a history of sampling is obtained. This may result in not requiring monitoring for some of these contaminants under certain situations or at certain locations, or adding more parameters/analytes if deemed necessary by the Executive Officer.

Rational for Analytical Test Method Selection

The rationale used for selecting test methods is based largely on the laboratory's ability to meet the detection limit requirements of the Table 4. All methods are EPA standards but may vary from time to time (based on changes from the EPA). Although, the driving force behind the selection of the test methods will be Regional Board's Re-use Guidelines.

Moisture Content

Sediments in creeks naturally contain moisture; moisture content may fluctuate during the year and is dependent on creek flows, groundwater elevation, and other local conditions. The moisture content of in-situ soils will be higher than the moisture content of excavated sediments, due to the natural process of evaporation and infiltration.

Analysis of moisture content is required for Class III landfill acceptance for wet soils. In addition, it is necessary to measure the moisture content in order to determine the dry weight concentrations of constituents within the sediment.

Selected Test Method and Frequency of Testing

All samples except residual sediment samples shall be analyzed for moisture content by EPA Method 160.3 or the most current prescribed method.

Toxicity

Creek sediments may be toxic due to nonpoint source pollutants which may have been deposited into the creeks. Toxicity is of concern if the sediment is to be reused. Sediment toxicity test will be conducted only on composite samples from sites where the waters may not be controlled during sediment removal operations due to tidal action; therefore toxicity sampling shall only be conducted on sediment removal projects which would not divert the water around the project site during excavation.

Selected Test Method and Frequency of Testing

All samples in tidal areas only, except residual sediment samples, shall be tested for toxicity by means of a toxicity screening bioassay, by the test method specified in California Code of Regulations, Title 22. The samples will be tested using Eohaustorius estuarius species, unless otherwise specified by the EPA.

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Methyl-Mercury Testing

Past mining operations allowed mining tailing and debris discharge to some creeks and this has increased mercury levels in sediments and soils in those watersheds, specifically the Guadalupe Watershed.

Selected Test Method and Frequency of Testing

Only the following creeks will be required to have the additional analysis of methyl mercury be performed for all composite samples, in accordance with EPA 1630:

Guadalupe Creek
Los Gatos Creek
Alamitos Creek
Randol Creek.

Quality Control

A QA/QC plan is an important component of a monitoring program involving extensive field sampling and laboratory analyses. The two objectives of the QA/QC plan are: 1) to provide a means of ongoing control and evaluation of the sampling and analysis procedures; and 2) to quantify data precision and accuracy for use in data interpretation. Duplicate samples are no longer required. The QA/QC plan will be followed in all phases of the monitoring program including sampling and validation reporting. QA/QC requirements are noted below.

The District will utilize a sampling contractor or internal staff to conduct field sampling. The assigned field staff and/or contractor will be responsible for managing all field sampling equipment. The actual assignment of sampling areas and analysis are given to the sampling staff by the Stream Maintenance Program Project Manager (PM). Verification of equipment, analysis, chain of custodies, etc. will also be conducted by the PM.

All equipment used for field sampling will be kept in good working order and if required will be tested and/or calibrated before leaving the office. Verification of working order/calibration (if necessary) should be re-verified, visually, upon arrival at the site to ensure the instruments are in proper working condition.

Laboratory

Whichever laboratory is used to perform analysis under this sediment sampling plan, they must be certified by the State of California Department of Health Services under the Environmental Laboratory Accreditation Program. For sub-labs that are out of state, they must hold current certification in their state's accreditation program. Further, the contract lab is required to perform their own quality control tests with the results published in the final lab report.

Reporting

Upon receipt of the analytical results from the laboratory, the District will submit the results to the Regional Board for review and approval. This will happen in the following manner:

The District shall attempt compile the results in 2 to 3 submittals to the Regional Board

1. For ease of review, only the contaminants that test above the Regional Board's Table 4 detection limits will be reported to the reviewing staff member of the Regional Board

2. The entirety of the results, for detected and non-detected, shall be maintained in the District's database and made available upon request. Further, the signed lab copy of the results shall be maintained for no less than 3 years by the District

3. The Regional Board shall review the detected contaminants and approve them for excavation and reuse. For project site sediments that are going to landfill, the Regional Board is only required to approve the removal of the material as the landfill will approve acceptance to their disposal facility.

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Attachment A

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Table 4: Recommended Sediment Chemistry Screening Guidelines for Beneficial Reuse of Dredged

ANALYTE	Wetland Surface Material		Wetland Foundation Material	
	Concentration	Decision Basis	Concentration	Decision Basis
METALS (mg/kg)				
Arsenic	15.3	Ambient Values	70	ER-M
Cadmium	0.33	Ambient Values	9.6	ER-M
Chromium	112	Ambient Values	370	ER-M
Copper	68.1	Ambient Values	270	ER-M
Lead	43.2	Ambient Values	218	ER-M
Mercury	0.43	Ambient Values	0.7	ER-M
Nickel	112	Ambient Values	120	ER-M
Selenium	0.64	Ambient Values		
Silver	0.58	Ambient Values	3.7	ER-M
Zinc	158	Ambient Values	410	ER-M
ORGANOCHLORINE PESTICIDES/PCBS (μg/kg)				
DDTS, sum	7.0	Ambient Values	46.1	ER-M
Chlordanes, sum	2.3	TEL	4.8	PEL
Dieldrin	0.72	TEL	4.3	PEL
Hexachlorocyclohexane, sum	0.78	Ambient Values		
Hexachlorobenzene	0.485	Ambient Values		
PCBs, sum	22.7	ER-L	180	ER-M
POLYCYCLIC AROMATIC HYDROCARBONS (μg/kg)				
PAHs, total	3,390	Ambient Values	44,792	ER-M
Low molecular weight PAHs, sum	434	Ambient Values	3,160	ER-M
High molecular weight PAHs, sum	3,060	Ambient Values	9,600	ER-M
1-Methylnaphthalene	12.1	Ambient Values		
1-Methylphenanthrene	31.7	Ambient Values		
2,3,5-Trimethylnaphthalene	9.8	Ambient Values		
2,6-Dimethylnaphthalene	12.1	Ambient Values		
2-Methylnaphthalene	19.4	Ambient Values	670	ER-M
2-Methylphenanthrene		Ambient Values		
3-Methylphenanthrene		Ambient Values		
Acenaphthene	26.0	Ambient Values	500	ER-M
Acenaphthylene	88.0	Ambient Values	640	ER-M
Anthracene	88.0	Ambient Values	1,100	ER-M
Benz(a)anthracene	412	Ambient Values	1,600	ER-M
Benzo(a)pyrene	371	Ambient Values	1,600	ER-M
Benzo(e)pyrene	294	Ambient Values		
Benzo(b)fluoranthene	371	Ambient Values		
Benzo(g,h,i)perylene	310	Ambient Values		
Benzo(k)fluoranthene	258	Ambient Values		
Biphenyl	12.9	Ambient Values		
Chrysene	289	Ambient Values	2,800	ER-M
Dibenz(a,h)anthracene	32.7	Ambient Values	260	ER-M
Fluoranthene	514	Ambient Values	5,100	ER-M
Fluorene	25.3	Ambient Values	540	ER-M
Indeno(1,2,3-c,d)pyrene	382	Ambient Values		
Naphthalene	55.8	Ambient Values	2,100	ER-M
Perylene	145	Ambient Values		
Phenanthrene	237	Ambient Values	1,500	ER-M
Pyrene	665	Ambient Values	2,600	ER-M

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ATTACHMENT H

Water Quality Monitoring Plans
Regional Water Quality Control Boards
Central Coast and
San Francisco Bay

WATER QUALITY MONITORING PLAN

FOR THE
SANTA CLARA VALLEY WATER DISTRICT
MULTI-YEAR STREAM MAINTENANCE PROGRAM
-CENTRAL COAST REGION-

Revised by

Ray Fields
Project Manager
Stream Stewardship Unit

Shree Dharasker, P.E.
Engineering Unit Manager
Stream Stewardship Unit

Under the Direction of

Ann Draper
Assistant Operating Officer
Watershed Stewardship Division

November 2011

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Introduction

The purpose of the Stream Maintenance Program (SMP) is to alleviate local flooding problems and to meet the requirements of the Federal Emergency Management Agency for flood protection. To ensure compliance with the Central Coast Bay Regional Water Quality Control Board's (Regional Board) Waste Discharge Requirements (WDRs) field water quality parameters will be measured/observed by the Santa Clara Valley Water District (District) during SMP operations using active diversions, which include pH, turbidity, temperature and dissolved oxygen. This plan has been revised based on field conditions encountered during the years of operation of the SMP.

Purpose

The purpose of the Self-Monitoring Program is to verify compliance with the effluent and receiving water limitations issued under the WDRs by the Board. The plan also includes procedures for record keeping and reporting, to provide the documentation of compliance with receiving water requirements and prohibitions in the WDRs. This includes field/data reporting forms, sample collection, and formal annual reports to the Regional Board. A water quality monitoring report will be submitted to the Regional Board and other agencies/organizations (if requested) after the completion of each year's active diversion operations, in accordance with the Regional Board's WDRs.

Scope

The scope of this plan is to outline the process, means and verification of monitoring water quality during SMP projects that use active diversions for all 4 authorized types of construction (Bank Protection, Minor Maintenance, Vegetation Management and Sediment Removal).

Definition of Terms

Grab sample: an individual sample collected in a short period of time not exceeding 15 minutes. They are to be used primarily in determining compliance with effluent and receiving water limits. Grab samples only represent the condition that exists at the time the water and effluent are collected.

Point of discharge: the location point at which water diverted around the active site is discharged into **non-tidal** waters of the State.

Active site: the confine of a SMP activity occurring on a waterway in which a pump is being used to divert water around the project site.

Duly authorized representative: one who is

a. Authorization is made in writing by a principal executive officer, or

b. Authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity (e.g., field supervisor, project manager, chief engineer).

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Downstream discharge/Effluent water: the water that flows out of a diversion, the discharged water (passive or active diversion)

Upstream water: water from a river or stream that is being diverted around a project site, from the upper end of the project site

Receiving water: any water body that actually or potentially receives surface or ground water at the point of discharge, which passes over, through, or under dredged sediment during placement, dewatering, settling/consolidation, and excavation/removal activities – the water body that receives the discharge

Active diversion: any method of diverting water around a project site other than non-mechanical means.

Passive diversion: the method of diverting water around a project site using no mechanical means. As well, working in channel where the project is being conducted outside of the live stream because of a natural buffer, such as excavating in pockets of sediment, will be considered a passive diversion.

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Specifications for Sampling and Analyses

The District will perform sampling and analyses in accordance with the following conditions and requirements included in the WDRs issued by the Regional Board. Two types of data collection will be conducted at the sites - water quality observations and water quality analyses using field instruments. No laboratory analyses will be conducted.

Water Quality Standard Observations:

Standard observations of surface water conditions shall be conducted upstream and downstream of the active project area to visually detect impacts of the water diversion. The following standard observations of the receiving waters will be collected on every day of operation on the field reporting form (Appendix A):

1. Floating and suspended materials of waste origin (to include oil, grease, or other material that may come from the diversion/project site) presence or absence and size of the affected area. Note what will be done if there is presence of material coming from or caused by the diversion.
2. Discoloration and turbidity: description of color, source, distance of travel and wind direction
3. Odor: presence or absence, characterization, source, distance of travel, and wind direction
4. Hydrographic condition including: depth of water columns, sampling depths, time and height of corrected low and high tides
5. Weather condition including: air temperature, wind direction and velocity (speed), and precipitation

Water Quality Analysis using Field Instruments:

Water Quality Testing:

Water Quality data will be collected by direct immersion of the instrument probe into the water column, or directly immersed into collection apparatus. The sample will be immediately analyzed on site for constituents in Table 1. Samples shall be collected with accurately calibrated field measurement instrument(s) and the results logged.

Table 1

Constituents	**Type of Sample**	**Units**
Turbidity	Grab/Dip	NTUs
pH	Grab/Dip	Not Applicable
Dissolved Oxygen	Grab/Dip	mg/l
Temperature	Grab/Dip	Degrees Fahrenheit

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Water Quality Testing Locations

Samples will be collected at a distance of 100 feet (or at a location that is most representative of the typical undisturbed condition) upstream of the beginning of the active diversion and 100 feet (or at a location that is most representative of surface water affected by the diversion) directly downstream from the point of discharge into the receiving water of the non-tidal sites. The samples will not be taken during a rainstorm event or subsequent runoff event. Samples of the discharge from temporary storage sites (if utilized) are to be collected as near as possible to the point of discharge without compromising the safety of personnel. Wherever possible, the probes will collect data from 1 foot below the surface.

Water Quality Testing Frequency

At every active diversion site, water quality samples shall be collected at least twice daily. Each sample set collected at the upstream and downstream locations must be taken within no more than a half an hour of each other (unless some outstanding circumstance exists).

Background Sampling (pre-construction baseline sampling):

Prior to the installation of an active diversion and/or its components, at least 1 day of background water samples (two samples per day evenly spaced during working hours) will be collected. If there is a change in stream conditions (eg. storm event) while there is a shutdown of the active diversion, new baseline sampling shall be conducted.

Operational Sampling:

Water quality samples will be collected at the active diversion sites, at least two samples per day, evenly spaced during the work hours, with the first sample collected no earlier than 1 hour after work has commenced each day.

Background Sampling (post-construction baseline sampling):

After the removal of an active diversion and/or its components (either/or when pumps are shutoff and water is reintroduced into the project site), at least 1 day of background water samples (two samples per day evenly spaced during working hours) will be collected at a minimum of 100 feet upstream of the planned placement of the active diversion. The samples will be representative of typical undisturbed conditions and will not be taken during a rainstorm or subsequent runoff event.

Stock Pile Sampling

Water draining from a temporary sediment stockpile will be sampled on every day that there is a discharge which enters into a live stream. Sampling will be conducted at all points of discharge/runoff. The sample will be immediately analyzed on site for constituents in Table 1.

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What is an Exceedance?

An exceedance is where the receiving (downstream) water quality sample result for constituent(s) analyzed on site show an exceedance of the upstream water sample results, as specified in Table 2.

TABLE 2

Parameter	**Exceedance Limit**
pH	>0.5 units deviation from background (upstream)
Dissolved Oxygen	minimum of 5.0 mg/l for tidal waters or non-tidal warm water Minimum 7.0 mg/l for non-tidal cold waters *or* no change if background <5.0 mg/l
Turbidity	Should not increase greater than 5 NTUs if background ≤50 NTUs and 10 percent if background >50 NTUs
Temperature	The temperature of any cold or warm freshwater habitat shall not be increased by more than 5°F (2.8°C) above the upstream temperature

What to do if there is an Exceedance

If any water quality monitoring sample results in an exceedance, then the District will implement the following process to correct the exceedance:

1. Confirmation samples will be taken within 2 hours following the exceedance. Sampling every 2 hours will continue until the exceedance has been corrected. All constituents will continue to be monitored.
2. Immediately implement procedures to identify the source of the exceedance.
3. Once the source of the exceedance has been identified, immediately implement procedures to correct the source of the exceedance.

Exceptions

The Regional Board recognizes that even with BMPs and appropriate equipment and methods, turbidity levels may momentarily exceed the limitations defined in the WDRs during the initial stage of such activities as (a) culvert invert cleaning for panel placement; (b) streambed preparation for bladder dam placement; (c) initial flow discharge in constructed bypass channels; (d) removal of panels and bladder dams; (e) placement and removal of coffer dams; and (f) installation and removal of corrective action measures. The following describes specific activities and duration of exceedance allowances:

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According to the WDRs issued by the Regional Board, at any given site, an exceedance of the turbidity limit during an activity described in SMP activities (a) through (d) above, for a duration of not more than four (4) hours, will not be considered a "violation" in the context of enforcement or the need to take corrective action. The District will take all reasonable actions to limit the duration and magnitude of such exceedance events. Water quality impacts shall be avoided/minimized to the maximum extent practicable.

According to the WDRs issued by the Regional Board, at any given site, an exceedance of the turbidity limit during an activity described in SMP activities (e) and (f) above will not be considered a "violation" in the context of enforcement or the need to take corrective action provided the duration of exceedance is:

Not More Than	**For Channel Widths**
4 hours	Less than 100 feet wide
6 hours	100 to 150 feet wide
8 hours	More than 150 feet wide

The District will take all reasonable actions to limit the duration and magnitude of such exceedance events.

Violation Reporting

If any receiving (downstream) water limit for a constituent(s) is exceeded as specified in Table 2 for more than a 2 hour period (after the first 2 hour confirmation sampling), then dredging will be terminated until the cause of the exceedance has been corrected. If after 6 hours the exceedance has not been alleviated, this will be considered a violation and must immediately be reported out to the Regional Board Executive Officer via the Regional Board case manager, by telephone.

For any other violations, the District will notify the Regional Board immediately whenever violations are detected at which time flood control activities (SMP project) will be terminated and the activity will not resume until the District has provided the Regional Board with a corrective action plan, acceptable to the Executive Officer that provides alternative methods of compliance.

Records to be Maintained

Written reports, calibration and maintenance records, and other records shall be maintained by the District and accessible at all times. Records shall be kept at the District for a minimum of 3 years. Records shall include notes and observations for each sample as follows:

a. Identification of sampling site by creek name, cross street, and item number (if available from the annual reports).

b. Date and time of sampling.

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c. Date and time analyses are started and completed and the name of person conducting analyses.

f. Data and results of analyses and/or observations.

Records shall include a map or maps of the site showing the location of the project(s) and water sampling locations, coffer dams, discharge pipes, access ramps, etc.

Quality Assurance and Quality Control

The QA/QC portion of the WDR is an important component of the monitoring program involving, at the core of compliance, quality assurance of field sampling. As such, this section describes the 2 major elements of the QA/QC plan which are (1) field sampling to ensure compliance with WDR criteria and (2) reporting of that compliance.

District utilizes sampling contractors and/or internal staff to conduct water quality sampling for the SMP projects. These monitors will use District approved field sampling instruments and sampling equipment. As field sampling is the ultimate means of ensuring compliance with WDR requirements, it is imperative to have operating procedures that show the field sampling is being conducted in a manner that will collect analysis in an accurate way. In order to do this, the following criteria must be followed:

1. All personnel conducting monitoring must read the relevant SMP best management practices, this WDR plan, the CCRWQCB Board Order, and manufacture calibration/instruction manuals for all sampling instruments used
2. The SMP Project Manger must train personnel conducting this activity on all aspects of water quality monitoring
3. Verification document signed that the relevant documents have been read and additional training has occurred

All this documentation will be held with the SMP Project Manager, for a period of three years. Further, all equipment will be tested and calibrated, in accordance with the equipment's manufacture requirements, at least once a week to ensure the instruments are in proper working condition.

The reporting of the compliance/non-compliance of each project meeting the WDR criteria is captured in an end of season report that is submitted to the Regional Board, see "Final Monitoring Report".

Reporting

Responsible Entity

The SMP Project Manager (PM) is responsible for implementing this Plan as required in the WDRs issued by the Regional Board for the SMP. The PM will evaluate the data for compliance with the requirements of the WDR and will inform the Watershed Field Operations of any noncompliance event in order for them to take immediate corrective action.

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Reports to the Regional Board

Permit Violations

The District shall notify the Regional Board staff in writing within five business days of all violations. Written reports shall include time and date of incident, duration, estimate of discharge or bypass volume, and documentation of sampling results/observations determining compliance status. The report shall also include detailed discussions of reasons for noncompliance and specific steps that were or will be taken to correct the failure and prevent it from re-occurring.

Final Monitoring Report

Upon completion of active diversion activities, a draft annual monitoring report will be filed with the Regional Board within 60 days of completion of all work, permitted activities end no later than October 30th.

The report will include:

1. Certification Statement
2. Introduction
3. Compliance Summary
4. Purpose and Scope
5. Description of Work Performed
6. Water Quality Sampling Data by Individual Site
7. Maps – County level showing where monitoring activities occurred

Embedded within these sections:

1. A transmittal letter which includes a summary of all violations of WDRs, any changes to the project design, and any unplanned releases or failures that occurred during the active diversion operations
2. The report shall provide: the magnitude of the releases or failures; any discharge limit exceedances; dates of all exceedances, cause of the failure, releases or other violations; any corrective actions taken or planned; and the dates of completion of corrective action

Final Report

Within 30 days after receipt of agency comments on the draft report, a final monitoring report will be filed with the Regional Board. The final report will be signed by the Chief Operating Officer of the Watersheds or a duly authorized representative of that person.

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WATER QUALITY MONITORING PLAN

FOR THE
SANTA CLARA VALLEY WATER DISTRICT
MULTI-YEAR STREAM MAINTENANCE PROGRAM
-SAN FRANCISCO REGION-

Revised by

Ray Fields
Project Manager
Stream Stewardship Unit

Shree Dharasker, P.E.
Engineering Unit Manager
Stream Stewardship Unit

Under the Direction of

Ann Draper
Assistant Operating Officer
Watershed Stewardship Division

November 2011

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Introduction

The purpose of the Stream Maintenance Program (SMP) is to alleviate local flooding problems and to meet the requirements of the Federal Emergency Management Agency for flood protection. To ensure compliance with the San Francisco Bay Regional Water Quality Control Board's (Regional Board) Waste Discharge Requirements (WDRs) field water quality parameters will be measured/observed by the Santa Clara Valley Water District (District) during SMP operations using active diversions, which include pH, turbidity, temperature and dissolved oxygen. This plan has been revised based on field conditions encountered during the years of operation of the SMP.

Purpose

The purpose of the Self-Monitoring Program is to verify compliance with the effluent and receiving water limitations issued under the WDRs by the Board. The plan also includes procedures for record keeping and reporting, to provide the documentation of compliance with receiving water requirements and prohibitions in the WDRs. This includes field/data reporting forms, sample collection, and formal annual reports to the Regional Board. A water quality monitoring report will be submitted to the Regional Board and other agencies/organizations (if requested) after the completion of each year's active diversion operations, in accordance with the Regional Board's WDRs.

Scope

The scope of this plan is to outline the process, means and verification of monitoring water quality during SMP projects that use active diversions for all 4 authorized types of construction (Bank Protection, Minor Maintenance, Vegetation Management and Sediment Removal).

Definition of Terms

Grab sample: an individual sample collected in a short period of time not exceeding 15 minutes. They are to be used primarily in determining compliance with effluent and receiving water limits. Grab samples only represent the condition that exists at the time the water and effluent are collected.

Point of discharge: the location point at which water diverted around the active site is discharged into **tidal or non-tidal** waters of the State.

Active site: the confine of a SMP activity occurring on a waterway in which a pump is being used to divert water around the project site.

Duly authorized representative: one who is

a. Authorization is made in writing by a principal executive officer, or

b. Authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity (e.g., field supervisor, project manager, chief engineer).

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Downstream discharge/Effluent water: the water that flows out of a diversion, the discharged water (passive or active diversion)

Upstream water: water from a river or stream that is being diverted around a project site, from the upper end of the project site

Receiving water: any water body that actually or potentially receives surface or ground water at the point of discharge, which passes over, through, or under dredged sediment during placement, dewatering, settling/consolidation, and excavation/removal activities – the water body that receives the discharge

Active diversion: any method of diverting water around a project site other than non-mechanical means.

Passive diversion: the method of diverting water around a project site using no mechanical means. As well, working in channel where the project is being conducted outside of the live stream because of a natural buffer, such as excavating in pockets of sediment, will be considered a passive diversion.

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Specifications for Sampling and Analyses

The District will perform sampling and analyses in accordance with the following conditions and requirements included in the WDRs issued by the Regional Board. Two types of data collection will be conducted at the sites - water quality observations and water quality analyses using field instruments. No laboratory analyses will be conducted.

Water Quality Standard Observations:

Standard observations of surface water conditions shall be conducted upstream and downstream of the active project area to visually detect impacts of the water diversion. The following standard observations of the receiving waters will be collected on every day of operation on the field reporting form (Appendix A):

1. Floating and suspended materials of waste origin (to include oil, grease, or other material that may come from the diversion/project site) presence or absence and size of the affected area. Note what will be done if there is presence of material coming from or caused by the diversion.
2. Discoloration and turbidity: description of color, source, distance of travel and wind direction
3. Odor: presence or absence, characterization, source, distance of travel, and wind direction
4. Hydrographic condition including: depth of water columns, sampling depths, time and height of corrected low and high tides
5. Weather condition including: air temperature, wind direction and velocity (speed), and precipitation

Water Quality Analysis using Field Instruments:

Water Quality Testing:

Water Quality data will be collected by direct immersion of the instrument probe into the water column, or directly immersed into collection apparatus. The sample will be immediately analyzed on site for constituents in Table 1. Samples shall be collected with accurately calibrated field measurement instrument(s) and the results logged.

Table 1

Constituents	**Type of Sample**	**Units**
Turbidity	Grab/Dip	NTUs
pH	Grab/Dip	Not Applicable
Dissolved Oxygen	Grab/Dip	mg/l
Temperature	Grab/Dip	Degrees Fahrenheit

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Water Quality Testing Locations

Samples will be collected at a distance of 100 feet (or at a location that is most representative of the typical undisturbed condition) upstream of the beginning of the active diversion and 100 feet (or at a location that is most representative of surface water affected by the diversion) directly downstream from the point of discharge into the receiving water of the non-tidal sites. For tidal sites, water samples will be collected only at the point of discharge on the receiving waters (with no upstream collection). The samples will not be taken during a rainstorm event or subsequent runoff event. For sites that straddle both freshwater and tidal areas, tidal sampling protocol will be followed. Samples of the discharge from temporary storage sites (if utilized) are to be collected as near as possible to the point of discharge without compromising the safety of personnel. Wherever possible, the probes will collect data from 1 foot below the surface (tidal and non-tidal sites)

Water Quality Testing Frequency

At every active diversion site, water quality samples shall be collected at least twice daily. Each sample set collected at the upstream and downstream locations must be taken within no more than a half an hour of each other (unless some outstanding circumstance exists).

Background Sampling (pre-construction baseline sampling):

Prior to the installation of an active diversion and/or its components, at least 1 day of background water samples (two samples per day evenly spaced during working hours) will be collected. If there is a change in stream conditions (eg. storm event) while there is a shutdown of the active diversion, new baseline sampling shall be conducted.

Operational Sampling:

Water quality samples will be collected at the active diversion sites, at least two samples per day, evenly spaced during the work hours, with the first sample collected no earlier than 1 hour after work has commenced each day.

Background Sampling (post-construction baseline sampling):

After the removal of an active diversion and/or its components (either/or when pumps are shutoff and water is reintroduced into the project site), at least 1 day of background water samples (two samples per day evenly spaced during working hours) will be collected at a minimum of 100 feet upstream of the planned placement of the active diversion. The samples will be representative of typical undisturbed conditions and will not be taken during a rainstorm or subsequent runoff event.

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Stock Pile Sampling

Water draining from a temporary sediment stockpile will be sampled on every day that there is a discharge which enters into a live stream. Sampling will be conducted at all points of discharge/runoff. Stockpile(s) must meet SMP Best Management Practice 1.8 and San Francisco Regional Water Quality Control Board – Board Order Condition D.2 standards. The sample will be immediately analyzed on site for constituents in Table 1.

What is an Exceedance?

An exceedance is where the receiving (downstream) water quality sample result for constituent(s) analyzed on site show an exceedance of the upstream water sample results, as specified in Table 2.

TABLE 2

Parameter	**Exceedance Limit**
pH	>0.5 units deviation from background (upstream)
Dissolved Oxygen	minimum of 5.0 mg/l for tidal waters or non-tidal warm water Minimum 7.0 mg/l for non-tidal cold waters *or* no change if background <5.0 mg/l
Turbidity	Should not increase greater than 5 NTUs if background ≤50 NTUs and 10 percent if background >50 NTUs
Temperature	The temperature of any cold or warm freshwater habitat shall not be increased by more than 5°F (2.8°C) above the upstream temperature

What to do if there is an Exceedance

If any water quality monitoring sample results in an exceedance, then the District will implement the following process to correct the exceedance:

1. Confirmation samples will be taken within 2 hours following the exceedance. Sampling every 2 hours will continue until the exceedance has been corrected. All constituents will continue to be monitored.
2. Immediately implement procedures to identify the source of the exceedance.
3. Once the source of the exceedance has been identified, immediately implement procedures to correct the source of the exceedance.

Exceptions

The Regional Board recognizes that even with BMPs and appropriate equipment and methods, turbidity levels may momentarily exceed the limitations defined in the WDRs

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during the initial stage of such activities as (a) culvert invert cleaning for panel placement; (b) streambed preparation for bladder dam placement; (c) initial flow discharge in constructed bypass channels; (d) removal of panels and bladder dams; (e) placement and removal of coffer dams; and (f) installation and removal of corrective action measures. The following describes specific activities and duration of exceedance allowances:

According to the WDRs issued by the Regional Board, at any given site, an exceedance of the turbidity limit during an activity described in SMP activities (a) through (d) above, for a duration of not more than four (4) hours, will not be considered a "violation" in the context of enforcement or the need to take corrective action. The District will take all reasonable actions to limit the duration and magnitude of such exceedance events. Water quality impacts shall be avoided/minimized to the maximum extent practicable.

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Not More Than	**For Channel Widths**
4 hours	Less than 100 feet wide
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The District will take all reasonable actions to limit the duration and magnitude of such exceedance events.

Violation Reporting

If any receiving (downstream) water limit for a constituent(s) is exceeded as specified in Table 2 for more than a 2 hour period (after the first 2 hour confirmation sampling), then dredging will be terminated until the cause of the exceedance has been corrected. If after 6 hours the exceedance has not been alleviated, this will be considered a violation and must immediately be reported out to the Regional Board Executive Officer via the Regional Board case manager, by telephone.

For any other violations, the District will notify the Regional Board immediately whenever violations are detected at which time flood control activities (SMP project) will be terminated and the activity will not resume until the District has provided the Regional Board with a corrective action plan, acceptable to the Executive Officer that provides alternative methods of compliance.

Records to be Maintained

Written reports, calibration and maintenance records, and other records shall be maintained by the District and accessible at all times. Records shall be kept at the District for a minimum of 3 years. Records shall include notes and observations for each sample as follows:

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a. Identification of sampling site by creek name, cross street, and item number (if available from the annual reports).

b. Date and time of sampling.

c. Date and time analyses are started and completed and the name of person conducting analyses.

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Records shall include a map or maps of the site showing the location of the project(s) and water sampling locations, coffer dams, discharge pipes, access ramps, etc.

Quality Assurance and Quality Control

The QA/QC portion of the WDR is an important component of the monitoring program involving, at the core of compliance, quality assurance of field sampling. As such, this section describes the 2 major elements of the QA/QC plan which are (1) field sampling to ensure compliance with WDR criteria and (2) reporting of that compliance.

District utilizes sampling contractors and/or internal staff to conduct water quality sampling for the SMP projects. These monitors will use District approved field sampling instruments and sampling equipment. As field sampling is the ultimate means of ensuring compliance with WDR requirements, it is imperative to have operating procedures that show the field sampling is being conducted in a manner that will collect analysis in an accurate way. In order to do this, the following criteria must be followed:

1. All personnel conducting monitoring must read the relevant SMP best management practices, this WDR plan, the SFRWQCB Board Order, and manufacture calibration/instruction manuals for all sampling instruments used
2. The SMP Project Manger must train personnel conducting this activity on all aspects of water quality monitoring
3. Verification document signed that the relevant documents have been read and additional training has occurred

All this documentation will be held with the SMP Project Manager, for a period of three years. Further, all equipment will be tested and calibrated, in accordance with the equipment's manufacture requirements, at least once a week to ensure the instruments are in proper working condition.

The reporting of the compliance/non-compliance of each project meeting the WDR criteria is captured in an end of season report that is submitted to the Regional Board, see "Final Monitoring Report".

Reporting

Responsible Entity

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The SMP Project Manager (PM) is responsible for implementing this Plan as required in the WDRs issued by the Regional Board for the SMP. The PM will evaluate the data for compliance with the requirements of the WDR and will inform the Watershed Field Operations of any noncompliance event in order for them to take immediate corrective action.

Reports to the Regional Board

Permit Violations

The District shall notify the Regional Board staff in writing within five business days of all violations. Written reports shall include time and date of incident, duration, estimate of discharge or bypass volume, and documentation of sampling results/observations determining compliance status. The report shall also include detailed discussions of reasons for noncompliance and specific steps that were or will be taken to correct the failure and prevent it from re-occurring.

Final Monitoring Report

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2. Introduction
3. Compliance Summary
4. Purpose and Scope
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6. Water Quality Sampling Data by Individual Site
7. Maps – County level showing where monitoring activities occurred

Embedded within these sections:

1. A transmittal letter which includes a summary of all violations of WDRs, any changes to the project design, and any unplanned releases or failures that occurred during the active diversion operations
2. The report shall provide: the magnitude of the releases or failures; any discharge limit exceedances; dates of all exceedances, cause of the failure, releases or other violations; any corrective actions taken or planned; and the dates of completion of corrective action

Final Report

Within 30 days after receipt of agency comments on the draft report, a final monitoring report will be filed with the Regional Board. The final

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report will be signed by the Chief Operating Officer of the Watersheds or a duly authorized representative of that person.

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Field Reporting Forms

APPENDIX A

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Stream Maintenance Program Data Reporting Form

Creek Name/Item Number	Sample Date/Time	Direction	Turbidity	Dissolved Oxygen	pH	Temperature	Activity Monitored

Stream Maintenance Program Calibration Form

Instrument Identifiaction	Time of Calibration	Date of Calibration	Issues

Field Observation Reporting Form

Site Information

Site Name	Site Location	Date

Standard Observations

Weather

Air Temperature	Precipitation (Heavy/Light)	Wind Direction/Speed

Visual

Floating Suspended Materials

Present Absent

If present, what is the suspected source?

Turbidity/Discoloration

Present Absent

Water Depth

U/S D/S

If present, Site Foreman Notified? _____ Time/Name_____

Odor

Present Absent

If present, describe suspected source and estimate of affected area (wind direction and travel distance)

If present, Site Foreman Notified? _____ Time/Name_____

Flow (FOR NON TIDAL SITES)

Estimated rate (cubic feet per second)

Tides (FOR TIDAL SITES) from NOAA tide chart

Time	Height

Appendix B
NOTICE OF PREPARATION AND COMMENTS RECEIVED

Notice of Preparation

To: Responsible, Federal and Trustee Agencies
(Agency)

(Address)

From: Santa Clara Valley Water District

5750 Almaden Expressway

San Jose, CA 95118

Subject: **Notice of Preparation of a Draft Subsequent Environmental Impact Report**

The Santa Clara Valley Water District (District) is the lead agency and is preparing a subsequent environmental impact report (EIR) for the project identified below. The District would like input from your agency and interested members of the public regarding the scope and content of the environmental information that is germane to your agency's statutory responsibilities in connection with the proposed project. Your agency may need to use the subsequent EIR prepared by the District when considering any permit or other approval related to the proposed project.

The project description, location, and potential environmental effects are contained in the attached materials. A copy of the initial study ☐ ***is*** ☒ ***is not*** attached.

Because of the time limits mandated by state law, your response must be sent at the earliest possible date but not later than 30 days after receipt of this notice.

Please send your response to Sunny Williams at the address above. Please include your name or the name of a contact person in your agency.

Project Title: Stream Maintenance Program Update

Project Applicant, if any: n/a

Date: 8/31/10

Signature:

Title: Chief Executive Officer

Telephone: (408) 265-2600

Email: smp_update@valleywater.org

Reference: Cal. Code Regs., tit. 14, (CEQA Guidelines) Sections 15082, subd. (a), 15103, 15375.

1. Introduction

Since the work season of 2002, the Santa Clara Valley Water District (SCVWD or District) has implemented the Stream Maintenance Program (SMP or Program) to guide routine flood protection maintenance activities within the District's creeks and canals. In 2009, the District initiated a Program update process to review and revise the Program manual, update the Program's environmental compliance documentation, and renew necessary Program permits. While the SMP is an ongoing program (indefinite time horizon), the initial 2001-02 SMP Manual and Final Environmental Impact Report used a 20-year planning horizon to forecast SMP activities and consider potential environmental effects.

Due to proposed updates to the SMP, changed circumstances, and new information, the District will be preparing a Subsequent EIR for the Program, pursuant to CEQA Guidelines Section 15162. The proposed Program update (including the revised SMP manual and this CEQA document) is intended to cover the 10 year planning period beginning in 2012 through 2022. These updated Program documents are intended to fully replace the original documents for the time period 2012-2022.

The Santa Clara Valley Water District is preparing a Subsequent Environmental Impact Report (SEIR) to provide the District, public, responsible agencies, trustee agencies, and permitting agencies with information about the potential environmental effects associated with the adoption and implementation of the updated SMP for the 2012-2022 period.

2. Project Area

The District boundaries are the same as Santa Clara County (see attached figure). The District has been granted jurisdiction on all streams within Santa Clara County. All facilities requiring routine stream maintenance are below 1,000 feet in elevation. The District maintains only those sections of creeks and canals where it has fee title or maintenance easements or where the District Board has provided specific direction. The District is divided into two major hydrologic basins (watersheds); one drains to San Francisco Bay (Santa Clara Basin) and the second drains to Monterey Bay (Pajaro River Basin).

3. Project Objectives

The overall flood protection goals of the SMP are to maintain the design flow or appropriate conveyance capacity of District facilities, and to maintain the structural and functional integrity of District facilities. In order to meet these goals, the SMP prioritizes and administers maintenance activities to achieve the following objectives:

- Remove sediment to maintain the hydraulic, safety, and habitat functions of the creek systems;
- Manage vegetation to maintain the hydraulic, safety, and habitat functions of the creek systems, and to allow for levee inspections and maintenance access;
- Conduct bank repairs on facilities that are not functioning appropriately; and

- Minimize impacts on the environment by incorporating stream stewardship principles into maintenance activities.

The SMP also seeks to obtain and maintain multi-year programmatic permits that regulate program activities.

4. Project Description

The SMP involves five categories of work activities: bank stabilization, management of animal conflict, minor maintenance, sediment removal, and vegetation management.

Bank Stabilization

Stream bank stabilization activities involve actions by the District to repair stream banks, levees and beds that are eroding or are in need of preventative erosion protection. The District may implement stream bank stabilization when the problem: (1) causes or could cause significant damage to District property and/or adjacent property; (2) is a public safety concern; (3) negatively affects transportation and/or recreational use; (4) negatively affects water quality or beneficial uses; or (5) negatively affects riparian habitat. Bank stabilization also includes preventative maintenance to stream banks that are threatening or vulnerable to erosion or instability. By addressing such vulnerable stream banks proactively, prior to active bank failure, erosion, or other destabilization, the District can reduce other environmental impacts (including loss of riparian habitat, loss of vegetation) or prevent other adverse effects to beneficial uses (such as increased sediment, loss of recreation trail, etc.).

Management of Animal Conflicts

Within the vicinity of District facilities, animal presence can conflict with District activities or damage infrastructure. This includes reduced stability of banks and levees as a result of burrowing, foraging on mitigation sites, and interfering with work activities. To avoid compromising District facilities and to reduce conflicts with species living in sites where work is needed, the management of animal conflicts may be undertaken.

Management of animal conflicts refers to the use of avoidance tactics, biological control, physical alterations, habitat alteration, and lethal control to reduce conflicts between District facilities and local species.

Minor Maintenance

Minor maintenance refers to those activities which are performed to make repairs and maintain District facility function. A minor maintenance activity is defined as work that results in the removal of less than 0.05 acres of wetland or riparian vegetation. The minimum reporting size for any vegetation work is 0.01 acres per project, which includes any vegetation work necessary for access or staging.

Sediment Removal

Sediment removal is the act of mechanically removing sediment deposited within a stream. The District's need for sediment removal is indicated when an accumulation of sediment reduces a stream's flow conveyance capacity, prevents facilities or appurtenant structures from functioning as intended, or impedes fish passage and access to fish ladders. Sediment is removed from District facilities to ensure that a stream will continue to provide flow. The SMP covers sediment removal within channels related to the need identified above; sediment removal under the SMP does not include increasing a channel's flow conveyance capacity beyond the as-built design.

Vegetation Management

Vegetation management activities are intended to maintain the hydraulic and safety functions of the District's creek systems through the control and management of vegetation. The methods of vegetation management included in the SMP are pruning, hand or mechanical removal, herbicide application, mowing, discing, flaming, and grazing.

Vegetation management also includes large woody debris (LWD) and non-native invasive plant removal component to improve the ecological health of District facilities and promote stewardship. The LWD program is used to assess the geomorphic and hydraulic effects of LWD in streams and incorporate additional LWD as appropriate to improve biological processes. Non-native invasive plant removal is conducted to enhance the habitat quality of identified areas and to benefit the larger watershed landscape.

Proposed Program Updates

Proposed updates to the Program may include the following:

Activity	Proposed Update
Bank Stabilization	• 8 modified repair methods • Agency review and response period shortened from 45 days to 30 days
Management of Animal Conflicts	Updated and detailed section describing animal management, including: • Maintenance of sanitary conditions • Avoidance • Biological control • Physical alterations • Habitat alterations • Non-lethal trapping/relocation

	• Lethal control
Minor Maintenance	• Cleaning and minor sediment removal activities at facilities/structures is limited to 50 cubic yards • Minor sediment removal less than 10 cubic yards per site may be removed anywhere in-stream
Sediment Removal	• Extended work window • New work areas
Vegetation Management	• Use of flaming and grazing techniques • Tree removal (clarification) • Herbicide application in Uvas/Llagas creeks (Pajaro Basin) • Extended work window • New work areas

5. CEQA Process

5.1 Notice of Preparation

This Notice of Preparation (NOP) presents general background information on the Program, the scoping and larger CEQA process, and the environmental issues to be addressed in the SEIR. The District has prepared this NOP pursuant to CEQA Guidelines section 15082.

5.2 Scoping Meeting

In order for the public and regulatory agencies to have an opportunity to ask questions and submit comments on the scope of the SEIR, a public scoping meeting will be held during the NOP review period. The scoping meeting will solicit input from the public and interested public agencies regarding the nature and scope of environmental impacts to be addressed in the Draft SEIR.

At the meeting, a brief presentation will be made in order to provide an overview of the existing SMP and the CEQA process generally. Afterwards, an interactive session will follow where District staff will be available to answer questions and provide information about the Program. Prepared written comments will be accepted during the meetings, as well as during the 30-day NOP review period. Comment forms will also be available at the scoping meetings for those who wish to submit written comments during or at the meeting. Again, written comments may be submitted to the District at any time during the NOP review period.

The public scoping meeting is scheduled for Wednesday, September 22, 2010 from 6:30 p.m. to 8 p.m. at the Santa Clara Valley Water District, Headquarters Board Room, 5700 Almaden Expressway, San Jose.

This scoping meeting information has also been published in local newspapers and the District's website (www.valleywater.org).

5.3 Draft SEIR

The primary purpose of the SEIR is to analyze and disclose the reasonably foreseeable direct and indirect environmental impacts that may occur as a result of the Program. The Draft SEIR, as informed by public and agency input through the scoping period, will analyze and disclose the potentially significant environmental impacts associated with the Program and, where any such impacts are significant, identify potentially feasible mitigation measures and alternatives that substantially lessen or avoid such effects will be identified and discussed.

Below is a preliminary list of potential environmental impacts to be addressed in detail in the SEIR. The analysis in the Draft SEIR ultimately will determine whether these impacts are reasonably foreseeable, whether they are significant based on identified thresholds of significance, and whether they can be avoided or substantially lessened by potentially feasible mitigation measures and alternatives.

- Aesthetics
- Air quality
- Biological Resources
- Climate Change
- Cultural Resources
- Geomorphology
- Hazards and Hazardous Materials
- Hydrology and Water Quality
- Land Use and Planning
- Noise
- Public Services and Utilities (including Recreation)
- Transportation and Traffic
- Cumulative Impacts
- Irreversible Impacts

5.4 Public Review of the Draft SEIR

Once the Draft SEIR is completed, it will undergo public review for a minimum of 45 days. The District is also planning to hold a public meeting. The meeting will begin with a brief overview of the analysis and conclusions set forth in the Draft SEIR. This introductory presentation will then be followed by the opportunity for interested members of the public to provide oral comments to the District regarding the Program under CEQA. The date, time, and exact location of the public meeting will be published in local newspapers prior to the event.

5.5 Final SEIR

Written and oral comments received in response to the Draft SEIR will be addressed in a Response to Comments document which together with the Draft SEIR will constitute the Final SEIR. The Final SEIR, in turn, will inform the District's exercise of discretion as a lead

agency under CEQA in deciding whether to approve the Program. The Final EIR will also be used by responsible agencies and other permitting agencies in their decision-making to renew the Program permits.

6. Submittal of Scoping Comments

This NOP is being circulated to local, state, and federal agencies, and to interested organizations and individuals who may wish to review and comment on the Program or the Draft EIR at this stage in the process. In addition, the NOP is available for review at the District's offices and on the District's internet website (www.valleywater.org). Written comments concerning the scope and content of this SEIR are welcome.

Consistent with the time prescribed by State law for public review of an NOP, your response to and input regarding the project should be sent at the earliest possible date, but ***not later than October 4, 2010***. Please include your name, address, and contact number for your agency as applicable for all future correspondence related to the Program. Written comments may be sent via email or letter to:

Santa Clara Valley Water District
Attn: Sunny Williams
SMP Update Comments
5750 Almaden Expressway
San Jose, CA 95118

Email: smp_update@valleywater.org
Subject Line: SMP Update Comments

Horizon WATER and ENVIRONMENT

Figure 1: Program Area

California Regional Water Quality Control Board
San Francisco Bay Region

Linda Adams
Agency Secretary

1515 Clay Street, Suite 1400, Oakland, California 94612
(510) 622-2300 • Fax (510) 622-2460
http://www.waterboards.ca.gov/sanfranciscobay

Arnold Schwarzenegger
Governor

September 30, 2010
CIWQS Place No. 262259 (MB)

Sent via electronic mail: No hardcopy to follow

Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, CA 95118-3686

Attn: Ms. Ann Draper, Assistant Officer, Watershed Stewardship Division
Email: koven@valleywater.org

SUBJECT: **Stream Maintenance Program, Notice of Preparation of a Draft Subsequent Environmental Impact Report**

Dear Ms. Draper:

Water Board staff appreciates the opportunity to comment on the Notice of Preparation (NOP) of a draft subsequent environmental impact report for the renewal of the Santa Clara Valley Water District's (District) Stream Maintenance Program (SMP).

The District is preparing to apply for permit re-issuance for the SMP as the existing permit expires February 2010. The SMP is in the ninth year of a ten year permit. The District has put forth a major effort in the implementation and continued management of the SMP, which provides a coordination between flood maintenance requirements and stream stewardship (i.e. preservation and enhancement of stream habitat functions and values). The District is taking this opportunity to revise the SMP to become more effective at achieving the SMP goals of maintaining conveyance capacity, design flows, and structural and functional integrity of District facilities. The proposed revisions include changes to the existing maintenance activities (sediment removal, vegetation management, bank stabilization and minor maintenance) with the addition of management of animal conflicts, which will be provided in full detail in the SEIR.

Water Board staff has reviewed the NOP and provides the following comments.

General Comments

1. On May 14, 2001, Water Board staff provided written comments (SF Water Board 2001 letter) on the draft environmental impact report (DEIR) for the first permit period for the SMP. Please provide an update on the efficacy of activities and/or management strategies the District had proposed to change and/or implement in

response to the comments provided by the Water Board. The District's response to comments indicated various programs and strategies that could be effective and beneficial in achieving the Program goals and protecting water quality. For example, in the SF Water Board 2001 letter, comments related to sediment removal focused on sediment source management to reduce the sediment load into the creeks. The District responded with a strategy to manage the sediment source as part of the Clean, Safe Creeks and Natural Flood Protect 15-Year Plan and public outreach. Therefore, provide an update on whether such strategies were successful in sediment source management and other comments and District responses.

2. Water Board staff strongly encourages the District to avoid and minimize impacts within the bed and bank and riparian corridor to the maximum extent practicable.
3. The SEIR should include full disclosure of all impacts to water quality, existing and potential Beneficial Uses.
4. To have a better understanding of the Program area, the SMP document and also the SEIR should include a characterization of all the watersheds and associated channels including an inventory of associated resources and beneficial uses where maintenance activities are projected for the permit period.
5. How, if at all, will the maintenance activities change to accommodate the Guadalupe River Mercury TMDL?
6. How, if at all, will the maintenance activities change to accommodate the Stream Protection Policy (scheduled for public review late 2010)?

<u>Specific Comments</u>

1. Bank Stabilization: The SEIR should clearly identify the following:
    a. Any changes to existing bank stabilization methods and proposed new methods, including impacts, avoidance/minimization measures, and how these changes and new methods protect/benefit the stream system including water quality.
    b. The criteria for the inspection and prioritization of bank stabilization projects. This should also include how the District determines the type of bank repair method.
2. Sediment Removal: The SEIR should clearly identify the following:
    a. The sediment source, reason for sediment accumulation, and alternative source management strategies for all new projected locations of sediment removal.
    b. The process for sediment characterization including the types of testing for tidal and non-tidal locations.
3. Vegetation Management: The SEIR should clearly identify the following:

a. Flaming and Grazing Techniques: All impacts and avoidance measures associate with flaming and grazing, such as, fire control, runoff avoidance, animal waste runoff, animal access to water ways.

b. Extended Work Windows: How will the District be prepared to protect the project site in the event of rain during the extended time.

c. Herbicide Use:

   i. Impacts to water quality and beneficial uses including impacts from runoff, overspray, and drift.

   ii. Avoidance and minimization measures to ensure herbicide does not enter the creek.

   iii. Current Local, State and Federal regulations for herbicide use.

   iv. Water Quality monitoring.

d. Justification and associated impacts for removing the vegetation versus limbing up.

e. Types of vegetation to be managed (i.e. invasive versus native).

4. Minor Maintenance:

   a. It is not clear how 50 cubic yards represents the extent of work for all minor maintenance activities.

   b. Identify all impacts to water quality and beneficial uses associated with minor sediment removal of less than 10 cubic yards per site including avoidance and minimization measures to protect water quality?

5. Management of Animal Conflicts: Identify water quality impacts and avoidance/minimization measures associated with physical and habitat alterations, biological control, and non-lethal and lethal control.

If you have any questions, please contact Maggie Beth of my staff at (510) 622-2338 or via email to mabeth@waterboards.ca.gov.

Sincerely,

William B Hurley *for*

Bruce H. Wolfe
Executive Officer

Cc: Bill Smith, SCVWD
Shree D, SCVWD
Kristen O'Kane, SCVWD
Sunny Williams, SCVWD
Ken Swartz, Horizon
Luisa Valiela, US EPA
Vincent Griego, US FWS
Darren Howe, US NOAA
Paula Gill, US Corps
Cameron Johnson, US Corps
Tami Schane, CDFG

Comment on Scoping Received from Shaunn Mendrin, City of Sunnyvale by e-mail on 10/4/10.

From: Shaunn Mendrin
[SMTP:SMENDRIN@CI.SUNNYVALE.CA.US]
Sent: Monday, October 04, 2010 3:15:36 PM
To: smp_update
Cc: Lorrie Gervin
Subject: SMP Update NOP
Auto forwarded by a Rule
Hello Sunny,
The City of Sunnyvale does not have comments at this time. However, the City would like to review the EIR once it is released. Please provide a copy of the EIR and supporting documentation to myself and Lorrie Gervin, Environmental Division Manager in the Public Works Department. Please feel free to contact me should you have any additional questions.

Thank you,
Shaunn

Shaunn Mendrin, AICP
Senior Planner
Phone: (408) 730-7429
Web Page: Planning Division

City of Sunnyvale
Department of Community Development
Planning Division
456 West Olive Avenue
Sunnyvale, CA 94088

Comment on Scoping Received from Trish Mulvey by e-mail on 10/4/10.

my SMP comment is dreaming about busting out of silos (or at least "thinking outside the box") and hoping there might be consideration of looking inclusively at District mitigation needs during the life of the SMP and then putting together a package(s) that could be embraced by the community and the regulatory/resources agency staff and decision makers. my hope is to move beyond opportunistic property acquisition, and "postage-stamp" sized projects, to ideas that will have real benefit to stewardship of water and natural resources.

i'm sure you will have other ideas to add, but the ones that come to my mind in addition to SMP would include the the bank stabilization work in los alamitos creek (and probably other places) for the guadalupe mercury TMDL, planning for in-stream work needed in FAHCE and the three-creeks HCP and santa clara county HCP, anything needed for the dam seismic safety remediation, clean-safe-creeks and other flood protection projects, whatever the santa clara county elements will be for the san francisquito sediment TMDL and the san francisquito flood damage reduction and ecosystem restoration projects and their future maintenance needs. i'm also guessing mitigation needs will be identified in the water supply and infrastructure master plan, etc. etc. etc.

since some of these don't yet fall into the "known knowns" file, i also hope the approach to mitigation planning can be iterative and updated periodically - maybe at the 5-year point of the next SMP.

please let me know if you have questions
and thanks for your consideration of these suggestions
as you'll see, i'm copying a few probably "interested parties" too
trish

Trish Mulvey
527 Rhodes Drive, Palo Alto, CA 94303
(650) 326-0252 or mulvey@ix.netcom.com

Appendix C
2012–2022 SMP UPDATE MITIGATION APPROACH MEMORANDUM

Memorandum

Project: **Santa Clara Valley Water District - Stream Maintenance Program**

Subject: **Mitigation Approach for 2012-2022 SMP Update**

Date: November 18, 2011

To: Members of the SMP Inter Agency Working Group (IAWG)

From: Kristen O'Kane (SCVWD)
Sunny Williams (SCVWD)
Bill Smith (SCVWD)
Ken Schwarz (Horizon Water and Environment)
Michael Stevenson (Horizon Water and Environment)
Steve Rottenborn (H.T. Harvey and Associates)

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1. Purpose and Overview

The Santa Clara Valley Water District (SCVWD or District) implements its Stream Maintenance Program (SMP) to ensure that District streams and channels provide flood management functions. The District operates the SMP to balance flood management objectives while also seeking to protect and enhance natural resources. The purpose of this memorandum is to summarize the SMP's existing mitigation program and describe updates to the mitigation program that support the 2012 SMP Update process.

As described in Sections 2 and 3 below, the existing SMP mitigation program was developed in 2002 to provide defined "up front" programmatic mitigation for sediment removal and vegetation management activities. This original mitigation continues to address SMP's impacts in perpetuity for maintenance activities and work areas identified in the 2002 program work projections. Sections 4 and 5 describe the proposed approach to address mitigation needs for sediment removal and vegetation management activities in "new" work areas, that is, locations where work was not projected or conducted during the 2002-2011 period. Mitigation for potential impacts to special status species is described in Section 6. The mitigation approach for bank stabilization activities (Section 7) has not changed significantly since 2002, but some treatment techniques have been refined based on implementation experience since 2002. Mitigation monitoring and reporting requirements are summarized in Section 8.

The organization of this memorandum is summarized as follows:

Section 1 Purpose and Overview
Section 2 Background

Section 3	Summary of Existing SMP Programmatic Mitigation
Section 4	2012 SMP Update and Mitigation Approach
Section 5	Mitigation for New Sediment Removal and Vegetation Management Work Areas 2012-2022
Section 6	Species Targeted Habitat Mitigation
Section 7	Bank Stabilization Mitigation
Section 8	Mitigation Monitoring and Reporting

The District remains committed to providing adequate and effective mitigation for SMP impacts. This memorandum includes some new approaches in how mitigation requirements are identified and tracked. However, all mitigation objectives and activities are consistent with the existing mitigation program that has been in operation since 2002.

2. Background

In 2002, the District initiated the SMP as a comprehensive multi-year effort to maintain its flood protection channels and associated facilities. Core SMP activities include sediment removal, vegetation management, bank stabilization, management of animal conflicts, and minor maintenance. The primary objective of sediment removal and vegetation management activities is to provide necessary flow conveyance capacity in the District's channels as well as to maintain the functional integrity of its stream facilities and provide ancillary protection such as fire protection. The primary objective of bank stabilization and management of animal conflicts activities is to repair or preserve stable streambanks and levees under the District's jurisdiction. As designed and implemented, the SMP also included several steps to protect and preserve natural resources along the riparian and stream corridors, including tidal reaches, in the program area.

The District conducted CEQA analysis and compliance in 2001-02 and obtained long-term programmatic permits with the following resource and regulatory agencies: the U.S. Army Corps of Engineers (USACE), U.S. Fish and Wildlife Service (USFWS), National Marine Fisheries Service (NMFS), Regional Water Quality Control Board (RWQCB, San Francisco Bay and Central Coast Regions), California Department of Fish and Game (DFG), and the Bay Conservation and Development Commission (BCDC).

Most of the permits authorizing SMP activities during the first decade of the program will expire in 2012. The SCVWD is currently reviewing SMP operations, updating the SMP program manual, conducting a complete CEQA review of the SMP, and renewing its long-term permits.

For the SMP, compensatory mitigation is one element of a comprehensive impact avoidance, minimization, and compensation approach. Project planning, resource evaluations, and exclusionary practices are used to avoid impacts from maintenance activities. Best Management Practices (BMPs) are applied on-site to further minimize impacts. Residual impacts that are neither adequately avoided nor minimized may require compensatory mitigation depending upon the nature of the impact and the regulatory authority involved. In 2002 the District established the following goal for the SMP's compensatory mitigation program:

"The Stream Maintenance Program compensatory mitigation program should establish an optimal set of mitigation strategies, a combination of components that best balance opportunity, feasibility, and cost to provide the maximum benefit to the natural functions of the watersheds and streams of Santa Clara County." (Source: SCVWD Stream Maintenance Program Document, 2002)

3. Summary of Existing SMP Programmatic Mitigation

The SMP's existing programmatic mitigation for sediment removal and vegetation management is based on a comprehensive accounting in 2002 of the potential impacts from maintenance activities on in-stream wetlands, tidal wetlands, riparian vegetation, and other sensitive habitats in the program area. Table 1 summarizes the existing mitigation requirements for on-going SMP activities. The existing SMP mitigation program includes land acquisition, habitat protection and enhancement, and wetland restoration/creation to mitigate for maintenance activities. The mitigation elements shown in Table 1 provide mitigation in perpetuity for projected SMP maintenance activities in the locations that were identified in the 2002 SMP. The SMP mitigation program provides compensatory mitigation for stream maintenance program activities solely, and does not provide mitigation for other capital or construction projects. However, the maintenance of capital projects, once constructed and operating, can be provided through the SMP and its mitigation program.

Impacts from other non-projected maintenance activities such as bank stabilization projects are mitigated on an "as-needed" basis using defined mitigation ratios as maintenance projects occur. Bank stabilization mitigation is discussed below in Section 7.

As shown in Table 1, to date not all of the SMP's mitigation requirements have been met. The District is committed to completing all remaining mitigation requirements. Appendix A includes a letter from the District to San Francisco Bay RWQCB that describes the current status of the SMP mitigation program and presents a plan to meet all of the District's SMP mitigation requirements identified in the 2002 SMP and the associated permits for the 2002-2012 program period. The District Board has recently approved the purchase of a property (known as the "Castle & Cooke property"). This acquisition will satisfy the final remaining acquisition requirements from the original SMP mitigation period 2002-2012 for California red-legged frog mitigation. The Castle and Cooke property will also complete a portion of the requirements for freshwater wetland mitigation. The District is actively working to acquire additional properties that would meet the District's remaining freshwater wetland mitigation obligation.

While the District is in the process of completing all of the original mitigation requirements, it is important to acknowledge that the original SMP mitigation requirements were based on work estimates ("projections").

Over the course of the 2002-2011 period, the District has worked in fewer areas than were originally projected in the 2002 EIR. SMP work activities to date, compared to the original 2002 work projections, are summarized in the SEIR Project Description (Chapter 2) and in Tables 2-1, 2-2, and 2-3 of the SEIR. Because the District has not conducted all of the work that was projected in 2002, it has not incurred all of the impacts projected in 2002. The estimated impacts from the 2002 projected work amounts were the basis of the mitigation requirements.

As of the end of the 2010 work season (including years 2002-2009), the District has provided more mitigation in both the Santa Clara and Pajaro Basins than what was required, when compared to the actual work that was conducted and the impacts incurred. Table 2 provides a summary of sediment removal impacts incurred to date 2002-2010 and mitigation provided to date. Table 2 compares impacts to mitigation requirements by accounting for three work/projection situations: (1) where work was projected and done; (2) where work was not projected and done; and (3) where work was projected and not done. As shown in Table 2, mitigation accrues if the amount of work "projected and not done" is greater than the amount of work "done but not projected." In other words, if the District overall did less work then they projected, but provided mitigation for the entire projected amount, then there is mitigation provided without associated impacts as shown at the bottom of Table 2. As of the 2010 maintenance season, the District has provided an additional 9.41 acres of freshwater wetland habitat and 21.35 acres of additional tidal wetland habitat in the Santa Clara Basin, and provided additional mitigation of 6.2 acres of freshwater wetland habitat in the Pajaro Basin. These additional mitigation acres that were provided are considered additional to the mitigation that was necessary based on the actual impacts from work activities that were performed.

The additional mitigation is calculated based on work activities performed to date. In order to disassociate this additional mitigation from non-performed work activities, projected work that was not performed during the 2002-2012 period will be removed from the pool of channels where mitigation is provided in perpetuity for maintenance activities. Removing these channels from having perpetual mitigation status is necessary in order for the District to apply the additional mitigation toward other "new" channel areas. By removing the "projected but not done" channel areas (Table 2) from the pool of work areas that have perpetual mitigation status, the District is enabling other "new work areas" to be available to have the additional mitigation applied.

The maintenance areas that would have dedicated mitigation provided in perpetuity will be referred as *Permanent Mitigation Areas (PMA).* This concept is described further below in Section 5.1. Any addition of work areas into the *PMA* pool of areas mitigated in perpetuity would be reviewed by participating regulatory agencies. It is recognized by the District that implementing and achieving this long-term vision may take several decades. Until such time that the District achieves developing a long-term mitigation pool that provides mitigation in perpetuity for all projected maintenance activities, the District will also use the "pay as you go" annual mitigation approaches described in Chapter 5, in combination with acquisition efforts, to provide suitable mitigation for the impacts of SMP activities.

The District will complete its mitigation responsibilities as described in the 2002 EIR. As described above, because the original mitigation requirements out-paced the actual maintenance work conducted and related impacts, the District requests to apply the mitigation surplus as a credit toward future maintenance activities. The District is proposing to use the 21.35 acres of additional tidal habitat already provided as credit toward future tidal habitat impacts that are not yet identified or accounted for. Similarly, where applicable, the District would like to apply other habitat mitigation from the 2002-2012 program that has not yet been applied toward a performed work activity, to future habitat mitigation needs. When this is done, the projection of work from the 2002-2012 program will be removed from the *Permanent Mitigation Areas*. The application of removing 2002-2012 projections to

be applied toward future maintenance needs would be evaluated on a case by case basis by regulatory staff.

Section 5 below describes the approach to mitigate for impacts caused by maintenance activities in new work areas (i.e., areas where no maintenance has occurred during the period 2002-2011). The mitigation approach includes off-site land acquisition and restoration where possible, similar to the mitigation approach in the first ten years (2002-2012) of the program, with the additional option of on-site and off-site mitigation activities implemented yearly when acquisition-based mitigation is not available. This second category of mitigation would be based on the degree of actual maintenance work conducted ("pay as you go" type mitigation).

Table 1. Existing SMP Mitigation Program

Mitigation Type	Mitigation Purpose	Mitigation Requirement	Mitigation Completed to Date	Percent of Requirement Completed*
Tidal Wetland Restoration	Restore Bay salt ponds to tidal marsh conditions, provides mitigation for tidal wetland impacts.	30 acres	30 acres	100%
Freshwater Wetland Creation/ Restoration	Convert or restore areas to seasonal or perennial wetlands, provides mitigation for non-tidal wetland impacts.	10 ac Santa Clara Basin 4 ac Pajaro Basin	7ac Santa Clara Basin 4ac Pajaro Basin	70% Santa Clara Basin 100% Pajaro Basin
Stream and Watershed Protection	Preserve, protect, and improve streams and associated watersheds, provides mitigation for non-tidal wetland and CRLF impacts	Freshwater wetland habitat: ▪ 820-1080 ac acquired (81 ac credit) for Santa Clara Basin ▪ 11 ac credit for Pajaro Basin ▪ CRLF Habitat - 108 ac credit District wide	Freshwater wetland habitat: ▪ 10 ac credit (125 ac total) for Santa Clara Basin ▪ 11 ac credit (138 ac total) for Pajaro Basin ▪ CRLF Habitat – 56 ac credit Santa Clara Basin	▪ 12% Santa Clara Basin ▪ 100% Pajaro Basin ▪ 52% CRLF Habitat
Giant reed (*Arundo donax*) Control	Control giant reed outbreaks; map, revegetate, educate, and coordinate reed control efforts in County.	125 ac District wide	116 ac District wide	93%
Invasive smooth cordgrass Control (*Spartina alterniflora*)	Control Invasive Cordgrass along tidal shorelines, provides mitigation for time lag until tidal wetland mitigation is established	Up to 10 acres in tidal areas	10 acres	100%

* Note: with the purchase of the Castle & Cooke property, the mitigation requirements not yet complete as shown above would be completed. This status summary does not include achievement of final success criteria at completion of the monitoring period.

Table 2. Comparison of Projected Sediment Removal with Actual Work Performed (2002-2010)

Watershed	Vegetation Type	(1) Projected and Done Miles	(1) Projected and Done Impact Acres	(2) Not Projected and Done Miles	(2) Not Projected and Done Impact Acres	(3) Projected and not Done Miles	(3) Projected and not Done Impact Acres
Lower Peninsula	Freshwater wetland	1.10	2.40	0.04	0.03	1.06	0.99
	Tidal wetland	0.50	0.24	0.07	0.08	0.06	0.06
	Not wetland	1.70	0.00	0.48	0.00	1.20	0.00
West Valley	Freshwater wetland	2.40	9.00	0.81	1.09	2.90	2.80
	Tidal wetland	1.50	4.80	0.00	0.00	3.50	7.10
	Not wetland	0.50	0.00	0.01	0.00	3.00	0.00
Guadalupe	Freshwater wetland	5.40	14.70	3.08	1.96	1.70	4.90
	Tidal wetland	0.00	0.00	0.00	0.00	1.45	13.52
	Not wetland	0.60	0.00	0.39	0.00	0.67	0.00
Coyote	Freshwater wetland	5.40	19.75	1.55	2.80	4.70	6.60
	Tidal wetland	1.30	3.03	0.08	0.05	0.22	0.80
	Not wetland	1.40	0.00	0.03	0.00	2.50	0.00
SF Bay Basin total	Freshwater wetland	14.30	45.85	5.49	5.88	10.36	15.29
	Tidal wetland	3.30	8.07	0.15	0.13	5.23	21.48
	Not wetland	4.20	0.00	0.91	0.00	7.37	0.00
Pajaro Basin total	Freshwater wetland	7.31	10.15		1.50	4.10	7.70
	Not wetland	0.45	0.00	0.31	0.00	2.70	0.00
Whole Program total	Freshwater wetland	21.61	56.00	5.49	7.38	14.46	22.99
	Tidal wetland	3.30	8.07	0.15	0.13	5.23	21.48
	Not wetland	4.65	0.00	1.22	0.00	10.07	0.00

Overage SF Bay Mitigation:	Freshwater wetland	9.41	acres
	Tidal wetland	21.35	acres
Overage Pajaro Mitigation:	Freshwater wetland	6.20	acres

The overage mitigation is estimated by subtracting the "Done not Projected" impact from the "Projected not Done" impacts.

4. 2012 SMP Update and Mitigation Approach

4.1 New Work Areas for Sediment Removal and Vegetation Management

The SMP employs a variety of impact avoidance and minimization steps to reduce the likelihood of impacts resulting from maintenance, and to avoid/reduce the magnitude or intensity of impacts if they should occur. The SMP also includes detailed Best Management Practices (BMPs) to further avoid and minimize potential impacts caused by maintenance activities. The program's impact avoidance, minimization, and BMP measures are described in the SMP Manual and the 2012 SMP Update SEIR. However, in some cases, there are residual impacts from maintenance activities that are not fully reduced through the application of avoidance, minimization, and BMP measures. Residual impacts are those impacts that may require compensatory mitigation, as guided upon regulatory agency jurisdiction and authority.

The existing SMP mitigation approach began with projections of potential work activities for sediment removal and vegetation management; and on that basis, mitigation requirements were developed for anticipated impacts to sensitive communities and habitat for special status species (as shown in Table 1).

Additional description of program impacts, focused on conditions for special status species, is provided in the Biology section of the SEIR. The Biological Opinions (BOs) for the 2012 SMP Update to be issued by NMFS and USFWS, the USACE Section 404 permit, and the CDFG Section 2081 and streambed alteration agreement may result in refinements of some of the mitigation approaches described here, but any refinements will result in mitigation measures being equally or more effective.

The 2012 SMP Update involves new maintenance work areas. These new maintenance areas are identified in the series of maps presented in Chapter 2 (*Project Description*) of the SMP Update SEIR. Table 3 lists the creeks where new maintenance work activities will occur. If a creek or activity is listed in Table 3, it does not mean that the whole creek is subject to maintenance activities, or that a given activity did not occur in some reach of that creek during the period 2002-2011, but that maintenance activities may occur in a new reach of the creek as indicated in the blue segments of the maps of Chapter 2 of the SEIR. Potential residual impacts from maintenance that require mitigation in new work areas are similar in nature to the potential impacts that were identified in the original SMP EIR (2002). While the existing SMP program mitigation will continue to serve as mitigation for work conducted in the same work category (e.g., sediment removal, vegetation management) for the original work areas identified in the 2002 SMP, additional mitigation is now required for the new work areas.

Table 3. SMP 2012-2022 New Work Areas by Watershed and Creek

Watershed	Creek	Sediment Removal	Herbicide Instream	Instream Other Vegetation Removal	Herbicide Non-Instream	Non-Instream Other Vegetation Removal
Coyote Watershed						
	BERRYESSA CREEK	x	x	x	x	x
	CALERA CREEK	x	x	x	x	x
	COCHRAN CHANNEL				x	
	COYOTE BYPASS				x	x
	COYOTE CREEK	x	x	x	x	x
	COYOTE CREEK SECONDARY CHANNEL				x	x
	EVERGREEN CREEK			x	x	
	FISHER CREEK	x	x			
	FLINT CREEK		x		x	
	LOS COCHES CREEK	x	x		x	x
	LOWER PENITENCIA CREEK	x	x	x		x
	LOWER PENITENCIA CREEK SECONDARY CHANNEL	x				
	LOWER SILVER CREEK	x	x		x	
	MIGUELITA CREEK	x	x	x	x	x
	NORTH BABB CREEK	x	x		x	
	NORWOOD CREEK	x	x		x	
	PIEDMONT CREEK		x		x	
	QUIMBY CREEK	x			x	
	RUBY CREEK		x		x	
	SIERRA CREEK	x	x		x	
	SOUTH BABB CREEK		x		x	
	THOMPSON CREEK		x	x	x	x
	TULARCITOS CREEK		x		x	
	UPPER PENITENCIA CREEK	x	x	x	x	x
	UPPER SILVER CREEK	x			x	x
Guadalupe Watershed						
	ALAMITOS CREEK	x	x		x	x
	ALAMITOS DIVERSION CHANNEL	x	x		x	
	CALERO CREEK	x	x	x	x	x
	DAVES CREEK		x		x	
	EAST ROSS CREEK				x	
	GOLF CREEK	x	x		x	
	GREYSTONE CREEK				x	x
	GUADALUPE BYPASS 2	x				
	GUADALUPE BYPASS 3	x				
	GUADALUPE BYPASS 4	x				
	GUADALUPE CREEK	x				
	GUADALUPE RIVER	x	x		x	
	GUADALUPE SECONDARY CHANNEL	x				

Watershed	Creek	Sediment Removal	Herbicide Instream	Instream Other Vegetation Removal	Herbicide Non-Instream	Non-Instream Other Vegetation Removal
	KIRK DISTRIBUTION SYSTEM				x	
	LOS GATOS CREEK	x	x		x	x
	LYNDON CANYON CREEK					
	MCABEE CREEK			x		x
	PAGE DISTRIBUTION SYSTEM UPPER				x	
	RANDOL CREEK		x		x	
	ROSS CREEK	x	x		x	x
	SANTA TERESA CREEK				x	
	WEST BRANCH RANDOL CREEK		x		x	
Lower Peninsula Watersheds						
	ADOBE CREEK	x	x			
	BARRON CREEK	x			x	
	BARRON DIVERSION CHANNEL					x
	DEER CREEK		x		x	
	HALE CREEK	x			x	
	HENEY CREEK					x
	MATADERO CREEK	x	x		x	
	PERMANENTE CREEK		x		x	
	PERMANENTE DIVERSION CHANNEL		x			
	PROSPECT CREEK				x	
	SAN FRANCISQUITO CREEK	x			x	x
	STANFORD CHANNEL					
	STEVENS CREEK	x	x		x	
Uvas/Llagas Watersheds						
	BODFISH CREEK	x		x		x
	CORRALLITOS CREEK		x			
	EAST LITTLE LLAGAS CREEK	x	x	x	x	
	EDMUNDSON CREEK		x			
	LIONS CREEK		x			
	LLAGAS CREEK	x	x		x	
	LOWER MILLER SLOUGH		x		x	
	MADRONE CHANNEL	x	x		x	
	MATADERO CREEK			x		
	NORTH MOREY CHANNEL		x		x	
	PAJARO RIVER				x	
	PRINCEVALLE DRAIN		x	x	x	
	SOUTH MOREY CHANNEL	x	x		x	
	TENNANT CREEK				x	
	UPPER MILLER SLOUGH		x		x	
	UVAS CARNADERO CREEK	x	x		x	
	WEST BRANCH LLAGAS				x	

Watershed	Creek	Sediment Removal	Herbicide Instream	Instream Other Vegetation Removal	Herbicide Non-Instream	Non-Instream Other Vegetation Removal
	CREEK					
	WEST LITTLE LLAGAS CREEK		x		x	x
West Valley Watersheds						
	CALABAZAS CREEK	x	x	x	x	x
	DAVES CREEK		x		x	
	GUADALUPE SLOUGH				x	
	MISTLETOE CREEK				x	
	PROSPECT CREEK		x		x	
	REGNART CREEK	x	x		x	
	RODEO CREEK				x	x
	SAN TOMAS AQUINO CREEK	x	x		x	x
	SARATOGA CREEK	x	x		x	x
	SMITH CREEK		x			
	SUNNYVALE EAST CHANNEL	x	x			x
	SUNNYVALE WEST CHANNEL		x		x	x
	WILDCAT CREEK	x		x	x	

Table 4 summarizes projected sediment removal maintenance activities for the 2012-2022 period. These sediment removal activities may include up to 43 miles of creeks and canals in the program area, with approximately 35.4 miles in the Santa Clara Basin and 7.4 miles in the Pajaro River Basin. For the 2012-2022 work period, about 19 miles of new channel areas have projected sediment removal work where work was not previously projected during the 2002-2012 period. There is also about 15 miles of channel length where sediment removal work was previously conducted (2002-2012), but work is not projected in those locations for the 2012-2022 period. In sum, the 2012 SMP Update process is adding about 4.2 miles of channel length for sediment removal activities.

Table 4. Estimated SMP Sediment Removal Activities (2012-2022)

Watershed	2012-2022 Projected Sediment Removal (miles)	New Work Areas for 2012-2022 (miles)	Former Work Areas Not Projected for 2012-2022 (miles)
Santa Clara Basin			
Lower Peninsula	3.9	0.7	2.6
West Valley	3.8	0.9	8.3
Guadalupe	11	8.7	0
Coyote	16.7	5.9	0.7
Pajaro Basin			
Pajaro	7.4	3.1	3.5
Total	***42.8***	***19.3***	***15.1***

4.2 Identifying Mitigation Based on Actual Work Conducted

The District identified the 2012 new work areas based on its current understanding of maintenance needs for the coming 10-year period. However, as observed during the 2002-2012 work period (Table 2), it is highly unlikely that all of the identified potential work areas will have actual work conducted. Because of this issue, and the potential inaccuracy of using projected work estimates developed in 2009-2011 as a basis for defining mitigation requirements until 2022, the District is now adjusting its approach in how mitigation requirements are identified. The District is shifting its approach towards using the actual work areas (versus work area projections) as the basis for identifying mitigation requirements in new work areas.

The 2012-2022 maintenance work projections provided in the 2012 SMP Update SEIR remain reasonable and very useful estimates of where work will be conducted. The projections represent the District's best estimate of where work will occur. The work projections are "conservative" in that it is likely that work will not occur in all of the newly identified reaches shown in the maps of Chapter 2 of the SEIR. The work projections are therefore a good basis for considering a potential maximum impact to wetlands and other habitats to develop a suitable mitigation approach that can guide the next decade of the program.

As a result of this revised approach, there are two primary changes to the existing mitigation program for sediment removal and vegetation management activities for the 2012 SMP Update:

1. **Ecologic Services.** In addition to land acquisition-based mitigation projects that provide mitigation in perpetuity (i.e., mitigate for repeat impacts in the same work location), programmatic mitigation for sediment removal and vegetation management will now also include ecologic services-based mitigation projects for individual maintenance projects.[1] These approaches (described in Section 5 below) provide mitigation on a "pay as you go" or incremental basis. Ecologic services-type mitigation projects would only mitigate for an individual work activity, as opposed to mitigating for that type of work activity in that location in perpetuity. Service-based "pay as you go" mitigation would be identified annually based on the annual maintenance workplan (provided in the annual Notice of Proposed Work - NPW[2]) and verified in the end of year annual Post Construction Report (PCR)[3].

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[1] *"Ecologic services mitigation" refers to mitigation which is not based on land acquisition and management, but instead involves actions to improve the ecological and habitat quality at a given site – for instance, through invasive species removal or ecological restoration.*

[2] *The NPW is the document which the District submits annually to the various permitting agencies describing the annual work plan for that year.*

[3] *The PCR is the document which the District submits at the end of the year to the various permitting agencies describing the actual work which was completed during that year.*

2. **Project Specific Accounting.** Rather than identifying all the necessary mitigation areas (acreages) for impacts from sediment removal and vegetation management "up front" based on projections, mitigation criteria and metrics will be based on standard unit measures (typically acreages) and ratios, and the mitigation requirement will be identified annually based on the impacts anticipated in that year. This annual mitigation analysis will clearly distinguish mitigation requirements associated with new work areas from those locations where mitigation has already been complete because these areas were projected in 2002 and exist now in the Permanent Mitigation Areas (PMA).

These two adjustments to the mitigation program are further described in Section 5 below. The District will be able to use "pay as you go" mitigation projects/services to provide incremental mitigation annually on an as-needed basis. The District can also continue to purchase lands to address longer-term mitigation needs. In this way, the District will now have more flexibility to pursue suitable mitigation opportunities through either long-term land acquisition or annual mitigation project approaches. It is also noted that additional mitigation from the 2002 SMP mitigation program associated with work that was projected, but never completed (Stream and Watershed Protection) may potentially be applied to new work areas in need of mitigation support. The District will work with the appropriate regulatory staff to identify, review, and approve the potential application of existing additional mitigation toward new SMP work areas, and removing the original 2002 projected area from the PMA.

It is important to note that the location and extent of bank stabilization activities are difficult to predict and have never been projected work activities. Since 2002, bank stabilization projects that require mitigation have been mitigated using an annual assessment and "pay as you go" incremental mitigation process. For bank stabilization projects, identifying impacts and necessary mitigation will continue to occur annually depending on what bank work is needed. Section 7 of this memorandum describes bank stabilization mitigation in more detail.

4.3 Procedure for Addressing Maintenance and Mitigation Requirements if Work Needs to Occur Outside of Projected Areas

As described above, the 2012 SMP Update SEIR identifies projected work areas where it is anticipated that maintenance work may occur during the 2012-2022 period. However, it is possible that a maintenance location or activity could arise in this period that was not included in the projected work activities and locations described in the SEIR. The SEIR described such a possibility and evaluated impacts throughout the entire SMP area (i.e., all streams below the 1000-foot elevation contour) within which such non-projected activities could occur. As such, no impacts are anticipated to occur from work conducted outside of the projected work locations that have not already been considered in the SEIR's impact analysis and related mitigation strategies. That said, this section describes the procedure to identify, review, and confirm mitigation needs for such non-projected maintenance locations or activities, as they arise.

A. Maintenance work locations and activities will be tracked and reported annually through two reports: the spring season NPW, which provides the specific locations and extent of proposed work during the upcoming maintenance season; and the end of year PCR, which will verify the

B. Non-projected work areas and/or activities will be evaluated, tracked, and included or excluded from the annual SMP workplan as follows:

1. *Non-projected work areas or activities (in non-sensitive areas) that are similar and consistent with the Program Manual, SEIR, regulatory permits/approvals, and other environmental compliance documentation as relevant:* The SMP is a long-standing program whose range of activities is now well understood. As such, the Program Manual, SEIR, permits and other regulatory approvals, and other program documents describe a range of activities and environments within the Program Area. If a non-projected work activity or maintenance location were to arise that were entirely consistent with the conditions and analyses provided by the Program's existing environmental compliance documentation, this would be identified in the annual NPW. The proposed maintenance activity or location would be evaluated for the application of standard SMP impact avoidance and minimization procedures, including the application of BMPs and other measures described in the SEIR and Biological Opinions. In the NPW, the District would describe the resource conditions at the proposed non-projected work location and describe how those conditions are consistent and adequately addressed by existing program documentation and measures. This site description would include a basic description of the site's physical setting including the primary physical processes at work, a basic description of the site's biological resources, site photo(s) as necessary, and a description of any site feature/characteristic that may require special attention in relation to maintenance. The District would confirm the consistency of the proposed activity or work location with regulators, and then conduct the maintenance work, track the work for the PCR, and provide necessary mitigation similar to any projected maintenance activity or location.

2. *Non-projected work areas or activities (in sensitive areas) that are similar and consistent with the Program Manual, SEIR, regulatory permits/approvals, and other environmental compliance documentation as relevant (and require no additional impact avoidance, minimization, or BMP measures):* In this case the non-projected work is identified to occur in an area known for sensitive resource conditions. Similar to Case #1 above, the non-projected maintenance activity and location will be evaluated by the District for its consistency with the existing environmental protocols and impact avoidance and minimization approaches as described in the Program Manual, SEIR, regulatory permits/approvals, etc. If the application of standard SMP impact avoidance and minimization approaches would result in consistent impact findings with the SEIR, regulatory permits/approvals, then the non-projected work area or activity would be considered consistent with the existing Program documentation and the proposed work

would be described as such in the NPW. In the NPW, the District would describe the resource conditions at the proposed non-projected work location and describe how those conditions are consistent and adequately addressed by existing program measures. Similar to what is described above for the general non-projected work site. The site description would include a basic description of the site's physical setting including the primary physical processes at work, a basic description of the site's biological resources, site photo(s) as necessary, and a description of any site feature/characteristic that may require special attention in relation to maintenance. What is different in this scenario is that for a particular reason, there is an increased awareness of the site's sensitivity. In this case, the site description might include how any existing BMP measures might be tailored to the specific work site to ensure an effective and more focused approach to impact avoidance or minimization. The District would confirm the consistency of the proposed activity or work location with regulators, and then conduct the maintenance work, track the work for the PCR, and provide necessary mitigation similar to any projected maintenance activity or location.

3. *Non-projected work areas or activities (in sensitive areas) that require additional impact avoidance, minimization, or BMPs to be consistent with terms and conditions of Program Manual, SEIR, regulatory permits/approvals, etc.* In this case it would be concluded that potential impacts at the non-projected maintenance activity or work area cannot be avoided or minimized to a level consistent with the existing SEIR and regulatory permits/approvals, without application of additional measures not currently included in the Program's environmental compliance documentation. In this situation, the non-projected work areas are not suitable for inclusion in the NPW or to be maintained under the SMP authorizations. The District may pursue individual or supplemental environmental review and authorizations for such projects.

4.4 Estimated Wetland and Riparian Habitat Impacts for Maintenance Areas

Table 5 identifies all of the projected areas (not just the new areas) of impact for SMP activities in non-tidal areas to the following riparian vegetation and wetland habitats: woodlands, herbaceous (non-wetlands), wetlands (impacted by instream sediment removal), aquatic wetlands, herbaceous wetlands, shrubs, and other miscellaneous habitats. The District's vegetation based habitat classification system is summarized in Appendix B. The classification system is based on hydromorphic and mesomorphic classes, with sub-units depending on formation, macrogroup, alliance, and wetland presence. Table 6 is a similar estimate of projected impacts for work in tidal areas. For both Table 5 and Table 6, impacts are identified for the main SMP work activities, including: sediment removal, herbicide, hand removal, discing, mowing, and hand pruning activities. These activities are described in the revised 2012 SMP Manual. Potential impacts are also identified by the principal District watersheds: Lower Peninsula, West Valley, Guadalupe, Coyote, and Pajaro. These watersheds are identified in the maps of Chapter 2 of the 2012 SMP Update SEIR.

Table 5. Projected Impacts by Habitat Type and Activity, non-tidal reaches (acres)

		Habitat Type						
Watershed	**Activity Type**	**Woodlands**	**Herbaceous (non-wetland)**	**Sediment Wetland**	**Aquatic (wetland)**	**Herbaceous (wetland)**	**Shrub**	**Misc.**
Lower Peninsula	Sediment Removal	3.587	0.51	2.200	0.000	0.625	0.000	4.084
	Herbicide	6.52	3.253	na	0.000	0.209	0.262	7.765
	Hand Removal	0.064	0.000	na	0.000	0.000	0.000	0.002
	Discing	0.000	0.000	na	0.000	0.000	0.000	0.000
	Mowing	0.967	2.659	na	0.000	0.008	0.025	0.604
	Hand Pruning	0.139	0.011	na	0.000	0.000	0.000	0.084
	Lower Peninsula Subtotal	*11.277*	*6.433*	*2.200*	*0.000*	*0.842*	*0.287*	*12.539*
West Valley	Sediment Removal	2.065	3.227	8.530	0.000	0.798	0.059	1.426
	Herbicide	22.639	31.329	na	0.000	2.066	0.321	25.161
	Hand Removal	0.076	0.01	na	0.000	0.000	0.005	0.005
	Discing	0.000	0.000	na	0.000	0.000	0.000	0.000
	Mowing	1.816	7.644	na	0.000	0.314	0.000	0.358
	Hand Pruning	0.225	0.056	na	0.000	0	0.001	0.102
	West Valley Subtotal	*26.821*	*42.266*	*8.530*	*0.000*	*3.178*	*0.386*	*27.052*
Guadalupe	Sediment Removal	31.89	5.199	14.640	0.000	1.091	2.405	13.654
	Herbicide	42.051	65.511	na	0.000	1.916	1.782	19.619
	Hand Removal	0.237	0.052	na	0.000	0.001	0.015	0.004
	Discing	0.071	1.15	na	0.000	0.000	0.000	0.000
	Mowing	25.006	20.909	na	0.000	1.242	2.914	15.517
	Hand Pruning	0.221	0.046	na	0.000	0.001	0.000	0.003
	Guadalupe Subtotal	*99.476*	*92.867*	*14.640*	*0.000*	*4.251*	*7.116*	*48.797*
Coyote	Sediment Removal	45.564	9.472	28.090	0.009	0.786	2.031	4.702
	Herbicide	30.24	137.874	na	0.001	34.432	1.299	33.286
	Hand Removal	3.175	0.993	na	0.000	0.036	0.069	0.262
	Discing	1.287	5.199	na	0.000	0.635	0	0.226

Table 5. Projected Impacts by Habitat Type and Activity, non-tidal reaches (acres)

		Habitat Type						
Watershed	**Activity Type**	**Woodlands**	**Herbaceous (non-wetland)**	**Sediment Wetland**	**Aquatic (wetland)**	**Herbaceous (wetland)**	**Shrub**	**Misc.**
	Mowing	8.151	20.502	na	0.000	0.000	0.567	1.776
	Hand Pruning	11.27	3.138	na	0.000	0.045	0.188	0.586
	Coyote Subtotal	*99.687*	*177.178*	*28.090*	*0.010*	*35.934*	*4.154*	*40.838*
SF Basin Total	Sediment Removal	83.106	18.408	53.460	0.009	3.300	4.495	23.866
	Herbicide	101.450	237.967	na	0.001	38.623	3.664	85.831
	Hand Removal	3.552	1.055	na	0.000	0.037	0.089	0.273
	Discing	1.358	6.349	na	0.000	0.635	0.000	0.226
	Mowing	35.940	51.714	na	0.000	1.564	3.506	18.255
	Hand Pruning	11.855	3.251	na	0.000	0.046	0.189	0.775
	SF Basin Total	**237.261**	**318.744**	**53.460**	**0.010**	**44.205**	**11.943**	**129.226**
Pajaro Basin Total	Sediment Removal	5.99	10.763	9.810	0.000	0.022	0.038	3.743
	Herbicide	49.097	86.642	na	0.268	1.083	0.579	10.719
	Hand Removal	4.173	2.239	na	0.047	0.276	0.037	0.442
	Discing	1.731	8.584	na	0.000	0.000	0.000	10.596
	Mowing	12.865	36.979	na		0.286	0.000	6.494
	Hand Pruning	2.334	4.007	na		0.005	0.037	0.111
	Pajaro Basin Total	**76.190**	**149.214**	**9.810**	**0.315**	**1.672**	**0.691**	**32.105**

Source: SCVWD, 2011

Notes:
1. Includes areas that were also projected for maintenance (and/or maintenance was conducted) during the 2002-2012 period
2. Acreages are shown for the total projection of each work activity type, this includes acreages for overlapping work activities at the same location, so potential impacts are over represented.
3. Acreages incorporate the work area percentage estimate to account for varying work amounts within a reach.
4. Miscellaneous habitat type includes features/elements as shown in Appendix B (*Vegetation Classification System*)
5. "Sediment wetland" refers to wetland and aquatic habitats (combined) projected to be impacted by sediment removal, based on calculations performed by the SCVWD taking into account the length of reaches where sediment removal is projected and the approximate widths of the wetland/aquatic habitat within those reaches. The SCVWD then identified additional areas (i.e., outside the "sediment wetland" polygons) where the various SMP activities were projected in areas mapped by AIS as aquatic habitats (which are summarized in those tables as "aquatic (wetland)" impacts) and vegetation types that are considered herbaceous wetlands (summarized in those tables as "herbaceous (wetland)" impacts).

Table 6. Projected Impacts by Habitat Type and Activity, tidal reaches (acres)

		Habitat Type						
Watershed	**Activity Type**	**Woodlands**	**Herbaceous (non-wetland)**	**Sediment Wetland**	**Aquatic (wetland)**	**Herbaceous (wetland)**	**Shrub**	**Misc**
Lower Peninsula	Sediment Removal	3.704	0.971	0.370	0.000	0.316	0.069	2.539
	Herbicide	0.000	0.001	na	0.000	0.000	0.000	0.001
	Hand Removal	0.139	0.000	na	0.000	0.000	0.000	0.000
	Discing	0.000	0.000	na	0.000	0.000	0.000	0.000
	Mowing	0.000	0.000	na	0.000	0.000	0.000	0.000
	Hand Pruning	0.000	0.000	na	0.000	0.000	0.000	0.000
Lower Peninsula Subtotal		*3.843*	*0.972*	*0.370*	*0.000*	*0.316*	*0.069*	*2.540*
West Valley	Sediment Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	Herbicide	0.048	0.294	na	0.000	0.337	0.000	0.57
	Hand Removal	0.000	0.000	na	0.000	0.000	0.000	0.000
	Discing	0.000	0.000	na	0.000	0.000	0.000	0.000
	Mowing	0.000	0.000	na	0.000	0.000	0.000	0.000
	Hand Pruning	0.000	0.000	na	0.000	0.000	0.000	0.000
West Valley Subtotal		*0.048*	*0.294*	*0.000*	*0.000*	*0.337*	*0.000*	*0.570*
Guadalupe	Sediment Removal	2.82	17.302	18.080	0.000	1.611	0.069	1.892
	Herbicide	0.000	0.000	na	0.000	0.021	0.000	0.000
	Hand Removal	0.000	0.000	na	0.000	0.000	0.000	0.000
	Discing	0.000	0.000	na	0.000	0.000	0.000	0.000
	Mowing	0.000	0.000	na	0.000	0.000	0.000	0.000
	Hand Pruning	0.000	0.000	na	0.000	0.000	0.000	0.000
Guadalupe Subtotal		*2.820*	*17.302*	*18.080*	*0.000*	*1.632*	*0.069*	*1.892*
Coyote	Sediment Removal	0.127	1.231	3.050	0.000	0.541	0.000	2.053
	Herbicide	0.000	0.014	na	0.000	0.18	0.000	0.098
	Hand Removal	0.000	0.000	na	0.000	0.000	0.000	0.000
	Discing	0.000	0.000	na	0.000	0.000	0.000	0.000

Table 6. Projected Impacts by Habitat Type and Activity, tidal reaches (acres)

		Habitat Type						
Watershed	**Activity Type**	**Woodlands**	**Herbaceous (non-wetland)**	**Sediment Wetland**	**Aquatic (wetland)**	**Herbaceous (wetland)**	**Shrub**	**Misc**
	Mowing	0.000	0.000	na	0.000	0.000	0.000	0.000
	Hand Pruning	0.000	0.000	na	0.000	0.000	0.000	0.000
	Coyote Subtotal	*0.127*	*1.245*	*3.050*	*0.000*	*0.721*	*0.000*	*2.151*
SF Basin	Sediment Removal	6.651	19.504	21.500	0.000	2.468	0.138	6.484
	Herbicide	0.048	0.309	na	0.000	0.538	0.000	0.669
	Hand Removal	0.139	0.000	na	0.000	0.000	0.000	0.000
	Discing	0.000	0.000	na	0.000	0.000	0.000	0.000
	Mowing	0.000	0.000	na	0.000	0.000	0.000	0.000
	Hand Pruning	0.000	0.000	na	0.000	0.000	0.000	0.000
	SF Basin Total	**6.838**	**19.813**	**21.500**	**0.000**	**3.006**	**0.138**	**7.153**

Source: SCVWD, 2011

Notes:

1. Includes areas that were also projected for maintenance (and/or maintenance was conducted) during the 2002-2012 period
2. Acreages are shown for the total projection of each work activity type, this includes acreages for overlapping work activities at the same location, so potential impacts are over represented.
3. Acreages incorporate the work area percentage estimate to account for varying work amounts within a reach.
4. Miscellaneous habitat type includes features/elements as shown in Appendix B (Vegetation Classification System)
5. "Sediment wetland" refers to wetland and aquatic habitats (combined) projected to be impacted by sediment removal, based on calculations performed by the SCVWD taking into account the length of reaches where sediment removal is projected and the approximate widths of the wetland/aquatic habitat within those reaches. The SCVWD then identified additional areas (i.e., outside the "sediment wetland" polygons) where the various SMP activities were projected in areas mapped by AIS as aquatic habitats (which are summarized in those tables as "aquatic (wetland)" impacts) and vegetation types that are considered herbaceous wetlands (summarized in those tables as "herbaceous (wetland)" impacts).

5. Mitigation for New Sediment Removal and Vegetation Management Work Areas 2012-2022

This section describes how mitigation will be provided for sediment removal and vegetation management activities at new channel locations not included in the existing SMP mitigation program. Within these areas, mitigation will be provided for impacts to the following vegetation types: riparian woodlands, sediment wetland, aquatic (wetland), herbaceous (wetland), and riparian shrub.

This section of the memorandum includes the mitigation approaches listed below. These mitigation approaches address impacts as described in the Biological Resources chapter of the SEIR (relevant impact discussions are shown in parenthesis).

- Section 5.1 Acquisition and Restoration Program (Impact BIO-1: Loss or Disturbance of Wetlands and Other Waters; Impact BIO-2: Loss or Disturbance of Woody Riparian Vegetation)
- Section 5.2 Invasive Plant Management Program (Impact BIO-1: Loss or Disturbance of Wetlands and Other Waters; Impact BIO-2: Loss or Disturbance of Woody Riparian Vegetation)
- Section 5.3 Riparian Restoration and Planting Program (Impact BIO-1: Loss or Disturbance of Wetlands and Other Waters; Impact BIO-2: Loss or Disturbance of Woody Riparian Vegetation)
- Section 5.4 Application of Invasive Plant Management and Riparian Planting Programs
- Section 5.5 Mitigation for Tree and Shrub Removals 6-12 Inches (dbh) (Impact BIO-2: Loss or Disturbance of Woody Riparian Vegetation; Impact BIO-7: Loss of Ordinance Trees)
- Section 5.6 Instream Habitat Complexity Program (Impact BIO-8: Impacts on Steelhead)
- Section 5.7 Summary of Sediment Removal and Vegetation Management Mitigation

As described in the sections above, the existing SMP mitigation program will continue to serve as mitigation for maintenance work during the 2012-2022 period for areas projected in the 2002-2012 SMP. Using a variety of mitigation approaches, a mitigation "tool box," the District will provide suitable mitigation for impacts in new work areas. The mitigation programs described in this section are consistent with on-going District mitigation operations. The key addition for the SMP is to now provide both "acquisition" and "pay as you go" mitigation processes for the sediment and vegetation maintenance activities. Increasing mitigation opportunities increases the flexibility for finding suitable mitigation options in any given year. The District remains committed to finding suitable acquisition-type mitigation projects to support the SMP. The mitigation programs described in this section will provide mitigation specifically for the SMP and will not satisfy mitigation obligations for other District actions.

Figure 1 illustrates the decision making process to identify and prioritize mitigation during the 2012-2022 program period. Starting in the upper left corner of Figure 1, maintenance work sites will first be

identified as either being included in the 2002 mitigation program or not. If no "pay-as-you-go" mitigation had been conducted at the site in the last 5 years for vegetation management activities (as described below in Section 5.4), then mitigation will be required and the sequence along the right-hand side of Figure 1 is followed. For sites that require mitigation, a key distinction will be whether there an acquisition project available that can be applied to mitigate the maintenance work. If so, then an acquisition process will be conducted and the mitigation will be provided in perpetuity as described in Section 5.1 below. If not, then mitigation will be conducted on a "pay as you go" basis. On-site mitigation will be prioritized; if this is not feasible or if better opportunities exist off-site, then off-site locations would be pursued.

The mitigation approaches described below in Sections 5.2 – 5.7 will be considered for on-site application based on an assessment of the maintenance site's existing ecologic functions and values and what are opportunities and constraints to applying the various mitigation approaches. A mitigation approach for the work site and reach will be developed which prioritizes habitat restoration and enhancement activities which best match existing functions (in-kind mitigation), but also have the highest likelihood for success, sustainability, and do not result in an increased maintenance effort. If there is not an opportunity to provide feasible mitigation on-site, then off-site opportunities would be evaluated with a similar priority of matching the off-site mitigation with in-kind functions/services as those that will be affected along the maintenance reach.

5.1 Acquisition and Restoration Program

Consistent with the existing SMP mitigation program, land acquisition and restoration projects can be developed to serve as suitable mitigation for SMP maintenance activities in new work areas. As described in Section 3 above, the existing SMP mitigation program includes several acquisition and restoration elements that provide mitigation in perpetuity for previously defined work areas.

In developing the existing land acquisition and restoration mitigation programs, the District worked closely with regulatory staff and external stakeholders to develop the following guiding principles for mitigation options:

1. Restoration or creation of larger, sustainable sites is preferable to smaller, fragmented sites.
2. Compatible adjacent land uses, especially those in public ownership or other mitigation sites will be evaluated to determine sustainability and suitable size of a mitigation site.
3. The conservation, protection from further degradation, and enhancement of existing habitats is preferable to the creation of artificially supported systems.
4. A watershed-wide, programmatic approach is preferable to a project-by-project approach.
5. Specific watersheds, streams, or stream reaches will be targeted for mitigation, restoration, and enhancement where the most ecological function will be obtained. When looking at ecological function, the net gain in function will be considered in addition to the existing functions. Areas outside of target streams and watersheds can also be considered.
6. Mitigation will match impacts by basin (Santa Clara Basin versus Pajaro River Basin).
7. In-kind mitigation opportunities are preferred over out-of-kind.

8. Out-of-kind mitigation will be considered, however, if it benefits the overall health of streams and watersheds and has cost advantages.
9. Technically and pragmatically feasible program elements, with a high probability of success, are preferable to those elements with a higher risk of failure or are based on speculative technology or feasibility.
10. Proposal elements that can be scaled up or down in size, effort, and cost are preferred over those that are less flexible.
11. Ecologic enhancement[4] and restoration[5] activities providing mitigation must result in a net improvement to the site's condition.
12. Artificially supported mitigation approaches should be considered at a lower priority than self-reliant and sustainable systems.

These guiding principles will continue to be applied to the identification and selection of potential land acquisition and restoration mitigation projects.

While site-specific land acquisition and restoration mitigation projects are not yet identified to apply as specific mitigation for new work areas under the SMP Update 2012-2022, the general classes of such land acquisition mitigation projects are as follows:

- <u>In-kind preservation and enhancement</u>: The acquired lands provide similar ecologic functions and values to habitat areas impacted by SMP maintenance activities. Higher quality lands/habitats will be preserved. Ecologic enhancement activities may be applied to provide further lift in functions and values. The acquisition and preservation/enhancement of these higher quality lands will occur at a **ratio of 3:1**, meaning 3 acres of land shall be acquired, preserved, and/or enhanced for every 1 acre of impacted habitats due to SMP activities. For these lands, the District will prepare and implement a management and monitoring plan which identifies the ecological functions and values which are being preserved, and identifies the management measures that will be implemented to ensure those functions and values are maintained into the future. As a performance standard, the identified functions and values will

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[4] *Ecological enhancement activities recognize a site's existing physical and biological processes and seek to enhance or improve those processes which may be currently functioning at a less than optimal performance. Enhancement activities may also include improving the site's functions and values, either for the ecosystem as a whole or targeting a particular species or group of species.*

[5] *Ecological restoration activities evaluate a site's existing physical and biological processes and compare those conditions to either past on-site processes (or conditions at a suitable reference site) and seek to restore (or reintroduce) such processes and forms on-site that have been previously lost or degraded. While restoration activities may look to a site's past or to a suitable reference site, an effective restoration project must operate within the context of the current system and what processes the current system will support sustainably. Similar to enhancement activities, restoration activities may also include restoring the site's functions and values, either for the ecosystem as a whole or targeting a particular species or group of species.*

not be allowed to reduce in quality compared to their state at the time the lands began to function as mitigation.

- In-kind restoration: The acquired lands have good potential to provide similar ecologic functions and values to habitat areas impacted by SMP maintenance activities. However, restorative actions are necessary to lift the quality, functions, and values of the lands to provide a net improvement/benefit that can account as mitigation for SMP impacted habitats. Mitigation for acquisition and restoration lands will occur at a **ratio of 1.5:1**, meaning 1.5 acres of land shall be acquired and restored for every 1 acre of impacted habitats due to SMP activities. These lands would also have a management and monitoring plan developed that would describe the restoration activities, monitoring requirements, and performance standards. The performance standard for the restoration/replanting shall follow the mitigation feasibility assessment (MFA) approach described below in Section 7.3.
- Watershed lands (out-of-kind): These are acquired lands that provide more general conservation, open space, and habitat values, but the acquired lands are not specifically tied or matched in-kind to wetland or riparian habitats impacted by SMP maintenance activities. Acquired watershed lands may include broader habitat communities such as woodland and grassland. Ecologic enhancement activities may be applied to provide further lift in functions and values. The acquisition of more general watershed conservation lands will occur at a **ratio of 8:1**, meaning 8 acres of land shall be acquired and restored for every 1 acre of impacted habitats due to SMP activities. For these lands, the District would prepare and implement a management and monitoring plan as described for the in-kind preservation and management lands, and would adhere to the same performance standards.
- Enhancement or management of land that is owned by other agencies. Under this option, the District would collaborate with owners of land that is currently managed for open space or passive recreation, and implement one of the three bulleted mitigation approaches above. In this situation, the District would not acquire the mitigation lands but would enter into an agreement with the landowners to provide management and financial support toward preserving or improving lands toward beneficial outcomes, including improved habitats. In these cases, a detailed management plan for species would be the responsibility of the District, and not necessarily be managed by the landowner. The mitigation accounting for such "partnership projects", and how much mitigation would be provided to account for SMP activities, would be reviewed and developed with regulatory staff on a case-by-case basis.

By taking ownership of such mitigation lands, the District would commit these lands to conservation/preservation purposes in perpetuity (providing access and/or maintenance easements as necessary to support existing land functions). Because acquisition lands will be conserved in perpetuity, the mitigation they provide will also serve the SMP in perpetuity. The District shall identify funding mechanisms to support the long-term maintenance and conservation of such mitigation lands and projects[6]. As described above in Section 3, the District's long-term vision is to acquire enough land to

[6] Mitigation associated with the SMP is funded by the Watershed and Stream Stewardship Fund. The majority of the revenue for the Watershed and Stream Stewardship Fund is ad-valorem 1% property tax (an allocated share of countywide 1% ad valorem property tax receipts). The projected property tax revenue for fiscal year 2011-2012 is $45 million.

provide all necessary mitigation for SMP vegetation management and sediment removal activities. More specifically, the long-term acquisition of suitable properties will provide mitigation in perpetuity for long-term temporary impacts associated with stream maintenance activities.

In concept, a targeted land acquisition project will provide mitigation per the ratios identified above. Once mitigation lands are acquired, the District will identify which of the "new work areas" now identified under the 2012 SMP Update would be mitigated for (in perpetuity) by the acquired lands. The District will coordinate with regulatory agencies on this process as the need arises. Similar to providing mitigation for new work areas, this same process of acquiring lands to be applied as mitigation can be used to provide mitigation for other work areas that were not projected. Such "not projected but worked" areas from the 2002-2012 period can be added to the pool of *Permanent Mitigation Areas (PMA)*, that are mitigated for in perpetuity if appropriate mitigation lands are acquired and they provide a good match for such lands.

The *PMAs* will be a set of work areas that are mitigated for in perpetuity. These areas will grow as new work areas are mitigated through the land acquisition and enhancement process. Likewise, some areas may be removed from the PMA if work has never been performed in that area, and no need for future work in that area is anticipated. Under such a scenario, the projected work area (and its impacts) that are no longer necessary would be removed from the *PMA* program. The compensatory mitigation that had already been provided would remain, but would no longer be allocated towards a particular work activity/location. Work areas and activities that are not previously covered, as being included in the PMA, can be added to the PMA by applying this unallocated mitigation. In this way, unallocated mitigation-in-perpetuity from the 2002 program may now be applied to alternative work areas. As described above, any inclusion of such work areas into the *PMA* pool of work areas mitigated in perpetuity would be reviewed by participating regulatory agencies.

In general, maintenance on acquired lands would be similar in nature to the various activities which are part of the SMP. To the extent that maintenance activities on acquired lands are consistent with SMP covered activities, they would not require additional permitting. In these cases, maintenance activities on acquired lands will comply with the parameters, limitations and requirements of the 2012 SMP Update.

In summary, the SMP will account for mitigation needs for work activities by either 1) applying PMAs (mitigation in perpetuity); or 2) applying annual pay-as-you-go mitigation.

The sections below describe the District's pay-as-you-go type mitigation that will be provided annually depending on specific mitigation needs.

5.2 Invasive Plant Management Program

The primary goal of the Invasive Plant Management Program (IPMP) element of the SMP's compensatory mitigation package is to preserve and improve habitat within Santa Clara County streams and riparian corridors by reducing the population of ecologically impacting invasive plant species. Controlling the spread of invasive plant species is a critical element in improving the ecological health of

our streams and watersheds. Invasive plants thrive and spread aggressively, negatively altering resource allocation regimes, wildlife patterns, soil stability and water quality thus degrading habitat quality and the overall ecological value of a site. In addition, invasive plants can exacerbate flooding and fire danger, undermine structural assets, and impact access to roads, levees and trails. The IPMP will provide compensatory mitigation for SMP impacts to upland, riparian, freshwater and tidal wetlands by eliminating or significantly reducing the population of invasive plant species from these affected habitats.

The IPMP will have a two-pronged approach:

- A systematic program with the longer term objective of identifying, prioritizing, and controlling invasive plants throughout the SMP area.
- An opportunistic, site-specific approach with the objective to remove invasive plants from individual SMP work sites. As mitigation for SMP activities, each of the SMP maintenance sites will be evaluated for on-site invasive plant removal and control.

The intent is that these two approaches, operating at different yet complimentary spatial scales will enhance the overall ecological health of the SMP's creek ecosystems.

At the systematic program-area scale, the IPMP will develop a priority matrix of invasive plant species that integrates a variety of factors including: the 2006 CAL-IPC ratings, the anticipated rate of spread without management intervention, the feasibility of effective control, impacts to fish and wildlife, impacts to sensitive plant communities, increases in flood threat, increases to fire danger, aggressive growth patterns known to cause structural damage, and impediments to maintenance access. Priority target species will be selected annually from this matrix. Following development of the matrix, the IPMP will then prioritize locations to implement plant control. High priority sites will include areas where:

- Targeted invasive species are degrading habitat for sensitive fish and/or wildlife species.
- Invasive plant removal and subsequent native habitat colonization will improve connectivity between existing patches of high-quality habitat.
- The upstream extents of invasive plant species distribution (within the SMP area) will reduce the potential for re-invasion of control sites via propagule dispersal from upstream source populations.
- Invasive plant control is technically feasible (e.g., given access constraints) and can be accomplished while minimizing impacts to adjacent aquatic, wetland, and riparian habitats as well as urban development.

5.3 Riparian Planting Program

The primary goal of the riparian planting component of the SMP mitigation package is to compensate for the loss of quality and quantity of native-dominated riparian habitat due to sediment removal and

vegetation management. Riparian planting will enhance habitat for birds, amphibians, and other wildlife using terrestrial riparian areas while providing shading, sources of organic matter and coarse woody debris, and water quality benefits to aquatic species. Restoration will be accomplished primarily via the revegetation of creek banks and floodplains within the SMP area where the existing physical conditions (i.e., topography, hydrology, and soils) are suitable for the establishment of native-dominated riparian habitat. The planting palette for the Riparian Planting Program is shown in Table 7. This list of species is not inclusive and each revegetation site will be assessed for ecologically appropriate native species. Riparian planting may also include site preparation, including minor grading and topsoil preparation, and incorporation of soil amendments.

Opportunities for riparian planting and restoration will be evaluated at all SMP vegetation management and sediment removal maintenance locations. The District's preference will be to first prioritize riparian planting at maintenance sites, and in this way provide direct on-site mitigation for maintenance activities. Riparian planting and restoration will provide mitigation that directly addresses impacts associated with vegetation management activities as described in the 2012 SMP Update SEIR.

Specific revegetation plan details are highly dependent on conditions at each restoration site, particularly with regard to hydrology and soils. Where opportunities for on-site riparian planting and restoration are unavailable or highly constrained, the District will identify off-site locations that can provide suitable mitigation opportunities. Off-site riparian planting restoration sites will be prioritized toward:

- Stream reaches with riparian restoration opportunities for sensitive fish and/or wildlife species.
- Stream reaches where riparian restoration of existing riparian canopy gaps will improve connectivity between existing patches of high-quality riparian habitat.
- Stream reaches with riparian habitat gaps where invasive plant species have been treated to accelerate native riparian plant establishment and inhibit re-colonization by invasive plant species.

Table 7. Riparian Planting Palette for Mitigation Program

Botanical Name	Common Name
TREES	
Acer negundo	Box elder
Aesculus californica	Buckeye
Alnus rhombifolia	White alder
Platenus racemosa	Western sycamore
Populus fremontii	Fremont cottonwood
Populus trichocarpa	Black cottonwood
Quercus agrifolia	Coast live oak
Quercus douglasii	Blue oak
Quercus lobata	Valley oak
Salix laevigata	Red willow

Salix lasiandra	Arroyo willow
Salix lucida	Shining willow
SHRUBS	
Baccharis salicifolia	Mulefat
Cornus glabrata	Brown dogwood
Heteromoles arbutifolia	Toyon
Rhamnus californicaCA	Coffeeberry
Salix exigua	Sandbar willow
Sambucus mexicana	Elderberry
LOW PLANTS	
Artemesia californica	California sage
Artemesia douglasiana	Mugwort
Aster chilensis	Chilean aster
Clematis ligusticifolia	Virgin's Bower
Eriogonum fasciculatum	California Buckwheat
Euthamia occidentalis	Goldenrod
Leymus triticoides	Blue wild rye
Mimulus aurantiacus	monkeyflower
Rosa californica	California rose
Rubus ursinus	California blackberry
Symphoricarpos laevigatus	Snowberry

The target species composition, location, and extent of riparian planting and restoration will be related to the ecological functions and values impacted from SMP maintenance activities, such as temporary impacts to riparian vegetation resulting from pruning and selective tree removal. In sum, the benefits of restoration will offset the adverse effects of temporary habitat loss. District staff will: (1) select the necessary area, (2) plant it with appropriate spacing for each species to achieve success, (3) determine whether excess is possible, and (4) decide whether to plant the excess or not.

Riparian mitigation plantings are installed based on plant densities found in natural communities and factoring in the site's carrying capacity. For tree species (mature height and spread > 20'), plantings are installed at 12-15' on center (OC). For shrub species (mature height and spread < 20'), plants are installed at 6-8' OC. Using industry standard formulas, planting areas or quantities are calculated to provide mitigation based on *area* impacted or *number of trees/plants* impacted. Grasses, forbs, and herbaceous vegetation are not accounted for in the planting calculation, but in order to provide habitat complexity are typical components of planting projects. Any excess planted will be documented and used toward future impacts.

The performance standard for the riparian planting program shall follow the mitigation feasibility assessment (MFA) approach described below in Section 7.3.

5.4 Application of Invasive Plant Management and Riparian Planting Programs

A mitigation ratio of 1.2:1 (area mitigated to area impacted) shall be applied for habitat impacts from sediment removal and vegetation management activities. A key determinant of setting the ratio at 1.2 acres mitigated to every 1 acre of maintenance impacts is to recognize that the loss of instream wetland

vegetation and habitat due to SMP maintenance activities would be temporary. District studies indicate that instream wetland vegetation and habitats impacted due to sediment removal and vegetation management activities recover on average within 1-2 years following maintenance activities (Rankin and Hillman, 2000). Because the impacts would be temporary and self-recovering, a mitigation ratio of 1:1 might be appropriate. However, because there is a temporal loss of functions between the time when the habitat is impacted and when the mitigation is applied, an additional 20% mitigation requirement would be applied, resulting in a 1.2:1 mitigation ratio. This additional 20% is believed to be adequate to address the temporal loss of functions. The mitigation ratio is not higher than 1.2:1 to account for the temporary nature of impacts to which it applies (e.g., if the impacts stop, the wetland or riparian habitat in the impact area will become re-established). The 1.2:1 ratio is based on recent experience with other flood control channel maintenance programs, such as in Sonoma County where similar routine vegetation management and sediment removal activities are mitigated at a lower ratio of 1.1:1. The Sonoma County Stream Maintenance Program was approved by DFG and the other regulatory agencies that are authorizing the Santa Clara County SMP.

The District can use either the invasive plant management program or the riparian planting program (or a combination of the programs) to achieve this net mitigation target for annual projects. Both of these programs direct address impacts by improving riparian habitat quality.

Mitigation opportunities will be assessed annually at both on-site maintenance work locations and off-site locations within the SMP program area. Required mitigation acreages will be determined annually based on the annual maintenance workplan and its associated impacts to habitat types (i.e., upland, riparian, freshwater and tidal wetlands).

In mitigating for vegetation management projects, invasive plant management or riparian planting mitigation projects shall have a “shelf life” or “warranty” for 5 years. This means that the mitigation required for impacts due to vegetation management activities provides 5 years of mitigation coverage for that maintenance site. In other words, once the invasive plant management or riparian planting mitigation is developed and applied for a specific maintenance project, the District can return to that maintenance site to conduct any vegetation management activity, any number of times, for up to 5 years. The District shall monitor invasive plant management and riparian planting mitigation sites in years 1, 3, and 5 and maintain the mitigation site to meet success criteria as described in the mitigation monitoring section below (see Section 8.1).

Invasive plant management activities often need to be repeated for maximum effectiveness. For repeated invasive plant management efforts at the same site (e.g. repeated arundo or blackberry removal), an individual mitigation project’s (i.e. removal action) mitigation standing will last for two years. This means that if any repeated invasive treatments occur on that site within two years, it does not count as additional or new mitigation that can be applied toward other SMP impacts. However, after two years, any subsequent invasive plant management activity occurring at that site may be counted toward other SMP impacts, at a partial acreage credit (50% of patch size for credit).

For riparian planting mitigation areas, the District commits to not impacting such areas for a minimum of

10 years. If the District impacts riparian planting mitigation areas, the impacted mitigation area will be replaced in-kind, and the monitoring clock will be reset for those areas for another 5 years.

This "shelf life" or "warranty" of 5 years does not apply to impacts caused by sediment removal activities. Impacts caused by sediment removal activities are mitigated on a "one time, pay as you go" basis. Repeated sediment removal work (if necessary) will require repeated mitigation, unless mitigation lands are acquired (per Section 5.1) that would enable the "new" maintenance area to be mitigated for in perpetuity.

The District shall describe the targeted invasive plant management or riparian planting mitigation activities in the annual NPW and verify implementation of the mitigation in the annual PCR. Planned acreages for mitigation activities, targeted plant species for removal, or targeted species for planting will be described in the NPW. Annual monitoring data for the mitigation sites shall be submitted to overseeing agencies (including USACE, USFWS, NMFS, San Francisco Bay RWQCB, Central Coast RWQCB, DFG, and BCDC) with other SMP monitoring results.

While both on-site and off-site opportunities will be considered, the District preference is to first apply invasive plant management and riparian planting activities on-site along stream channel reaches where other vegetation management maintenance or sediment removal activities are occurring. If on-site invasive plant management or riparian planting mitigation is not necessary at a particular maintenance reach, or there are other limits/constraints that prevent invasive plant management from being implemented, then the District will apply the mitigation at suitable off-site locations within the program area. The success criteria will be determined through the Mitigation Feasibility Assessment (MFA) process as described in Section 7.3 below.

5.5 Mitigation for Tree and Shrub Removals 6-12 Inches

Trees and shrubs less than 12" dbh may be removed under the SMP. The removal of trees and shrubs in new work areas, that are less than 6 inches dbh, is mitigated through the invasive plant management and riparian planting programs described above. Impacted maintenance areas from vegetation management and sediment removal activities (that include the removal of trees/shrubs less than 6" dbh) will be mitigated for according to the 1.2:1 ratio as described above.

Removing trees sized 6-12 inches dbh will be mitigated through the individual planting of replacement trees. Appendix C (*Tree Scoring for Removal of Trees and Shrubs 6 - 12"DBH - April, 2011)* provides a specific tree appraisal and evaluation protocol to determine how replacement planting occurs. The protocol in Appendix C involves carefully assessing targeted tree removals for their existing conditions and functions, including their canopy cover, local area value, ecosystem benefits, and ecosystem detriments. Using a cumulative ranking method, tree replacement mitigation ratios for removed trees (6-12 inches dbh) occurs at either 1:1, 2:1, or 3:1 (replacement tree to removed tree) depending on the overall quality and function of the removed tree. These tree replacement ratios are consistent with other recent tree replacement ratios approved by regulatory agencies for the Sonoma County Stream Maintenance Program whereby removed native vegetation is replaced at 2:1 ratio, removed non-native vegetation that provides some benefits is replaced at a 1.5:1 ratio, and removed problematic non-native

vegetation does not require replacement mitigation. Chapter 2 of the SMP Manual describes the District's vegetation management and tree removal activities in detail. The performance standard for tree replacement shall follow the mitigation feasibility assessment (MFA) approach described below in Section 7.3.

5.6 Instream Habitat Complexity Program

The District will develop, enhance, or provide in-kind installation of instream habitat complexity features to mitigate for the loss of instream complexity due to annual sediment removal and vegetation management projects, including large woody debris removal activities. The instream habitat complexity mitigation described in this section may also be suitable for application to bank stabilization mitigation projects as described in Section 7 below.

A complex instream and channel bed environment provides habitat heterogeneity, cover, and refugia during high flows. Prior to sediment removal, large woody debris removal, bank stabilization, or other maintenance activities, the affected work area will be surveyed by an SCVWD fisheries ecologist to identify any features that provide high-quality instream complexity for fish. The fisheries ecologist will determine whether such features are of "high quality" based on the presence of one or more of the following criteria:

- Large woody debris providing cover and refugia from high flow velocities
- Deep pools providing rearing habitat and refugia from high flow velocities
- Cobble/boulder features providing cover, refugia from high flow velocities, and velocities suitable for good invertebrate drift

If such high-quality features must be removed during the proposed SMP activities, compensatory mitigation will be provided by the installation of instream complexity features at a ratio of 1:1 (mitigation-to-impact) basis. The 1:1 ratio can be assessed to either the *number* of instream complexity features affected by the maintenance activity or to the *area of impact* due to the maintenance work. Similarly, the required mitigation can be provided either on a "number of projects" or "area" basis depending on which metric is most appropriate based on the habitat values to fish provided. A District fisheries ecologist will determine which approach to determining the required mitigation (number of projects or area) is the most suitable.

In sum, either one instream complexity feature will be installed for each one that is removed (number approach); or, an instream complexity feature will be installed with a similar area as the impacted footprint (area approach). It is also acknowledged that erosion, deposition, tree-falls, and debris mobilization within a few years following the removal of an instream complexity feature will naturally reintroduce some complexity to the stream.

As examples, enhancing instream complexity would include:

- enlarging an existing large woody debris feature
- geomorphically shaping an instream bar or bed feature for improved habitat

- enhancing a pool feature threatened by sedimentation
- enhancing streambed conditions to increase the range of flow velocity and habitat conditions.

Priority for these mitigation activities will be given to SMP sites where instream features cannot be retained during construction due to conflicting objectives. For example, if a channel pool configuration cannot be retained during a bank protection job and the area is devoid of other complex bed or pool features, then this area will be evaluated for the addition of an instream complexity feature.

In addition to enhancing existing features, new instream features may be developed to achieve several habitat objectives, including: increasing pool habitat in homogenized stream reaches, providing escape cover for rearing and spawning fish, deepening feeding areas in riffle habitat, creating a variety of stream flow velocities for cover, sorting gravel, and providing resting areas for upstream migration. Additionally, improving instream function can benefit other aquatic flora and fauna by improving the overall stream complexity for which these species depend upon for survival. If effective, such new instream complexity features (particularly in highly modified, urban streams) can augment or replace existing structural features required for successful reproduction and rearing of native fish and amphibians in the freshwater environment.

Newly developed instream habitat improvements may use log structures, boulder structures, or a combination of both log and boulder structures to achieve more complex habitats. Possible configurations of boulders or logs include weirs, clusters, single and opposing wing deflectors, spider logs, and digger logs. The construction materials selected for each instream complexity feature would depend upon the target objective and site conditions.

The selected mitigation site will be as close to the impacted reach as is technically feasible. For instream complexity features that are removed by sediment removal or bank stabilization projects, mitigation will be incorporated into the same reach where instream complexity was removed to the extent feasible. The site will be selected with input from the District fisheries ecologist, taking channel capacity and other SMP-related factors into account. The fisheries ecologist will prepare specifications for the mitigation, including size, type, and configuration of the feature. The mitigation will be implemented within one year following the impact. As a performance standard, instream habitat improvements shall be maintained to serve designed functions for at least five years, and will be monitored annually to ensure compliance.

5.7 Summary of Mitigation for Sediment Removal and Vegetation Management Activities

Working together, land acquisition and habitat restoration, invasive plant species management, riparian planting and restoration, tree planting to replace 6-12” tree removals, and developing instream habitat complexity projects provide a broad spectrum of natural system functions and values that mitigate impacts from vegetation management and sediment removal maintenance projects. Table 8 summarizes the key attributes of the updated mitigation approach for sediment removal and vegetation management activities.

Table 8. Summary of Mitigation Approach for Sediment Removal and Vegetation Management Impacts in New Work Areas (2012-2022)

Mitigation Type		Mitigation Purpose	Implemented: Annually	Implemented: Program Period	Mitigation Location: Onsite	Mitigation Location: Offsite	Mitigation Amount or Ratio
A	Land Acquisition (in-kind preservation/enhancement)	Mitigates in perpetuity for repeat sediment removal and vegetation management activities		X		X	3:1 (acres acquired, preserved, enhanced: acres impacted)
B	Land Acquisition (in-kind restoration)	Mitigates in perpetuity for repeat sediment removal and vegetation management activities		X		X	1.5:1 (acres acquired and restored: acres impacted)
C	Land Acquisition (watershed lands out-of-kind)	Provides mitigation in perpetuity for repeat sediment removal and vegetation management activities		X		X	8:1 (acres acquired off-site: acres impacted)
D	Invasive Plant Management Program	Mitigates for one-time sediment removal or 5 years of vegetation management activities to address temporary impacts to wetlands, instream vegetation, and riparian habitat	X		X	X	1.2:1 (area treated: area impacted) (can occur in combination with Riparian Planting and Restoration)
E	Riparian Restoration and Planting Program	Mitigates for one-time sediment removal or 5 years of vegetation management activities to address temporary impacts to native-dominated riparian habitat	X		X	X	1.2:1 (area or # of plants planted: area or # of plants impacted) (can occur in combination with Invasive Species Management)
F	Tree and Shrub Plantings	Mitigates for impacts due to removal of individual trees and shrubs 6-12" dbh	X		X	X	1:1, 2:1, 3:1 (Trees planted: trees removed. Mitigation ratio determined by tree scoring protocol provided in Appendix C of Mitigation Memorandum)
G	Instream Complexity	Mitigates for one-time removal of instream complexity features and/or one-time impacts to "high quality" instream habitat	X		X	X	1:1 (area or # of features restored: area or # of features impacted)
H	Gravel Augmentation in Steelhead Creeks	Mitigates for one-time removal of "high quality" gravels in an area greater than 100 sq-ft	X		X	X	1:1 (acres or sq-ft restored: acres or sq-ft impacted)
BIO	Species Targeted Restoration/ Mitigation	Mitigates for impacts to species and/or associated habitat. On a case-by-case basis, may also be	X (as needed)			X	As needed, per permit requirements

Table 8. Summary of Mitigation Approach for Sediment Removal and Vegetation Management Impacts in New Work Areas (2012-2022)

Mitigation Type	Mitigation Purpose	Implemented:		Mitigation Location:		Mitigation Amount or Ratio
		Annually	Program Period	Onsite	Offsite	
	adequate to provide either one-time or perpetuity mitigation for non-species related habitat impacts (e.g., general impacts to wetlands, instream vegetation, and riparian habitat).					

Note (a) - because this mitigation is primarily species-targeted, it is described below in Section 6, rather than above in Section 5. However, it has been included in this table because of the general benefits it would provide to aquatic habitat in addition to steelhead.

6. Species-Targeted Habitat Mitigation

In addition to the mitigation described in Section 5 for sediment removal and vegetation management, mitigation will be provided to compensate for impacts to individual special-status species resulting from SMP activities. The species for which compensatory mitigation will be provided, and the form that this mitigation will take, is identified in the current 2012 SMP Update SEIR and will be further refined in BOs for the 2012 SMP Update to be issued by NMFS and USFWS and the ITP to be issued by DFG.

Although SMP activities could result in adverse effects on both individuals and habitat of special status species, mitigation will focus on improvement and/or protection of habitat for these species with the goal of increasing the abundance, productivity, and/or survivorship of individuals, commensurate with the magnitude of the impact. For potential affected species, the type of mitigation sought will depend on the nature of the impacted habitat (e.g., whether it involves breeding or foraging habitat), the size of mitigation required, and suitable mitigation locations. The specific mitigation qualities will be linked closely to the functions and values of habitat that are impacted by SMP activities. The 2012 SMP Update SEIR, the BOs from NMFS and USFWS, and the ITP from DFG will be used to refine the criteria, metrics, and/or ratios necessary to provide mitigation, but any refinements will result in mitigation measures being equally or more effective.

To the extent feasible, habitat mitigation for impacts to individual special-status species will dovetail with mitigation efforts to address impacts to wetlands and riparian habitats as described above. Ideally, a given set of mitigation actions can be performed and integrated to compensate for effects on multiple sensitive habitats and resources. Integrating mitigation solutions into joint projects is an efficient approach and provides multiple benefits. For example, riparian habitat restoration along a South County creek may provide compensation for temporary impacts to both riparian habitat and Least Bell's vireo habitat. Similarly, instream complexity or gravel augmentation (described below) activities along a steelhead creek may help address wetland impacts and/or temporary impacts to steelhead. In other instances, however, species-specific mitigation (such as compensatory mitigation for impacts to serpentine species) would not overlap with mitigation provided for impacts to regulated habitats such as wetlands and riparian habitats. In such cases, species targeted mitigation would be planned and implemented independently of other mitigation projects.

The specific extent of species-targeted mitigation will be identified annually using the previously developed criteria, metrics and/or ratios, based on the annual workplan and the specific species and habitats that would be affected. Impacts to habitat of individual species, and appropriate mitigation, would be identified annually in the NPW. Mitigation would then occur within that maintenance year, to the extent feasible. The amount of mitigation provided would then be compared to the actual impacts and resulting mitigation requirements in the PCR to determine whether additional species-targeted mitigation would need to be provided the following year or whether there is excess mitigation that can be credited toward a subsequent year's impacts. However, if mitigation requirements for special-status species can be estimated farther in advance, there is likely some economy of scale that would be realized from pursuit of species-targeted mitigation that would compensate for SMP impacts occurring over two or more years. For example, habitat acquisition, preservation, and/or enhancement may be

easier and less costly (on a per-acre basis) to plan and implement over a larger area than over a number of smaller areas. Using larger, consolidated mitigation areas may enable more efficient mitigation planning over several years. In these cases, either annual or multi-year mitigation activities would be identified. In this scenario, species-specific impacts and mitigation would still be tracked and accounted for annually. If a "mitigation credit" exists because the District previously purchased or established a larger mitigation area than previously needed, then the District will track the "mitigation account" through the annual SMP reporting processes (NPW and PCR) and relay this information to overseeing agencies.

Also, note that the District may seek to include Almaden-Calero Canal maintenance as a covered activity in the Santa Clara Valley Habitat Plan (for terrestrial species) and the Three Creeks HCP (for aquatic species). These plans would include mitigation or conservation measures that are required by the federal and California Endangered Species Acts to minimize impacts of covered activities on covered species. If Almaden-Calero Canal maintenance is included as a covered activity in these habitat plans, once the plans are adopted, satisfaction of species-targeted mitigation via in-lieu-fee payments or other measures contained in these plans would be possible for maintenance work along the Almaden-Calero Canal. This may be the required approach to maintain consistency with those plans. It is anticipated that this approach be adequate to reduce biological impacts of Almaden-Calero Canal maintenance to less-than-significant levels. The District will finalize this approach if/when these other habitat plans are adopted.

Gravel Augmentation in Steelhead Creeks

Instream gravel and coarse sediment along a streambed can be a fundamental habitat element to a healthy functioning stream directly supporting life-cycle needs of fish (including steelhead), amphibians and other aquatic wildlife. Often, gravel and coarse streambed sediment supply is reduced due to dams or other upstream barriers that trap sand, gravel, and coarse bed materials upstream behind the barrier. In addition to curtailing sediment supply, dams, reservoirs, and other upstream barriers also moderate or reduce the magnitude of stream flows such that natural gravel mobilization and transport processes are diminished. Dams or other facilities reduce flow magnitude and duration resulting in less frequent (or non-occurrence) flows strong enough to mobilize sediments along the channel bed.

The District actively removes sediment from stream channels when an accumulation of sediment reduces floodwater conveyance capacity or prevents a facility or structure from functioning as intended. Additionally, the District removes sediment to facilitate fish passage where sediment accretion has created passage impediments for migration or localized movements of fish. As a result of these efforts, general impacts to channel hydraulics, sediment transport and stream morphology may occur. To ameliorate those impacts and restore stream function, the District will implement projects to provide coarse substrate (sand and gravel) back into the creek.

Gravel augmentation provides direct benefits for improving fish spawning and rearing habitat. Gravel augmentation will be applied to mitigate for instream impacts on spawning and rearing steelhead habitat due to sediment removal activities. The general goal of gravel augmentation projects is to improve fish spawning and rearing habitat by enhancing sedimentary materials within the channel bed.

Some minor and localized stream and riparian impacts are expected to occur when crews and equipment place the gravel back into the stream course.

SCVWD can reuse watershed-specific gravels collected through sediment removal activities as a source for the gravel augmentation program. SCVWD would collect, sort, separate, and reuse clean, appropriately-sized gravel. When designing a gravel augmentation project, several factors will be considered, including: the existing channel conditions; the grain size distribution of the sediment to be added; the volume of gravel to deposit; the frequency of gravel addition that will be required in light of sediment transport; how the added gravel will interact with to the existing flow regime and/or channel geometry; and the extent of augmentation effects within the channel reach.

Gravel Augmentation Mitigation Commitment

Gravel augmentation may be provided as a mitigation approach for SMP impacts to Central California Coast steelhead (CCC) and South-Central California Coast steelhead (SCCC) spawning habitat. The approach to identifying high quality gravel sites slated for SMP sediment removal activities that would be potentially suitable for gravel augmentation (mitigation) is described below. This approach was developed in consultation with NMFS staff.

- A District biologist will review the sediment removal workplan and assess the footprint of work activities, identify whether or not the maintenance reach supports steelhead spawning habitat, and assess the texture and quality of the sediment to be removed.

- District biologists will visit SMP sediment removal sites (where more than 100 sq.-ft. of sediment are to be removed) to assess if high quality sediment suitable for augmentation projects is present.

- If the District biologist determines that as much as 100 sq.-ft. of “high quality” spawning gravel may be present throughout the sediment removal area (maintenance reach) as a whole, a grain size analysis will be conducted.

- The grain size analysis will be performed only for the areas that are thought to provide potential spawning gravel, and not averaged over the entire sediment removal area (e.g., maintenance reach areas that are clearly not suitable for spawning will not be included in the analysis).

- Sediment targeted for removal will be considered “high quality” spawning gravel according to the following criteria:

    - Gravel targeted for removal must have less than 25-30% fines that are less than 6.35 mm in size (Kondolf 2000, Kondolf and Wolman 1993).

    - Gravel targeted for removal must have less than 12-14% fines less than 0.85 mm in size (Kondolf 2000).

    - Gravel targeted for removal must have median particle size (D50) of 12.5 to 22.0 mm, based on D50 of preferred rainbow trout and steelhead gravel habitat, for

fish 30 to 65 cm in length (Kondolf and Wolman 1993), corresponding to a range of 275 to 640 cm of steelhead adults recovered in streams of the San Francisco estuary (Leidy et al. 2005).

- Minimum gravel evaluation patch size must be greater than 1.1 m^2 (Trush 1991).
- High quality habitat supported by gravel needs to be accessible to fish under typical flows for when appropriate life stages are present.

- If less than 100 sq.-ft. of gravel qualifies as high quality, no mitigation is necessary.
- Spawning gravel mitigation is not required for projects where the primary objectives are to maintain or enhance fish passage and to remove sediment at all fish ladders and stream gages.

If the targeted gravel for sediment removal maintenance along steelhead streams qualifies as "high quality" per these criteria, then compensatory gravel augmentation activities will be performed. Mitigation shall occur through the installation of suitable spawning gravel along the affected creek at a 1:1 (mitigation-to-impact) ratio on a square footage or acreage basis. The mitigation site will be as close to the impacted reach as is feasible, and will be located within a steelhead-accessible reach of the same watershed. The site will be selected with input from the fisheries ecologist, taking channel capacity and other SMP-related factors into account. The fisheries ecologist will prepare specifications for the mitigation, including size, type, depth, and configuration of gravel. The mitigation will be implemented within one year following the impact.

7. Bank Stabilization Mitigation

7.1 General Approach

Stabilizing and repairing eroding stream channel banks and levees is a routine SMP activity. Based on the maintenance work conducted from 2002-2010, the District stabilizes about 0.94 mi of stream channel banks or levees on average per year. While bank stabilization is routine and expected, the specific work locations are not certain until after each winter season. As a result, this type of maintenance (unlike sediment removal and vegetation management) is not a projected work activity. Rather, bank stabilization maintenance needs are assessed annually on an as-needed basis. Site-specific mitigation for bank stabilization projects is also determined on an annual basis depending on the identified work need.

The 2002 SMP Manual included Appendix E *Programmatic Impact Assessment and Mitigation for Routine Bank Protection Activities* (July, 2001) that described the mitigation approach for bank stabilization used during the 2002-2012 program period. The 2002 mitigation approach identified revegetation mitigation ratios of 1:1, 2:1, or 3:1 for treatment impacts depending upon the bank repair technique and the resulting change to the creek ecosystem. Bank repair treatments that used more hardened materials resulted in higher mitigation ratios.

For the 2012 SMP Update, the District has slightly revised and reorganized the list of suitable SMP bank stabilization treatments (Table 9). The general approach to bank stabilization and its mitigation is consistent with the 2002 program. Table 9 identifies the SMP's 13 bank stabilization treatments (and variations), shows mitigation ratios, describes whether the technique uses softscape or hardscape elements, and notes whether the technique requires review by regulatory agencies. The bank stabilization techniques shown in Table 9 are described in detail in the 2012 SMP Manual.

Table 9. SMP Bank Stabilization Methods (2012 SMP Update)

I.D. No.	Method	Mitigation Ratio	Hard-/Softscape	Requires Plan Review by Agencies
1	Earth Repair	1:1	Soft	No
1A	Earth Repair with Buried Rock	1:1	Soft	No
2	Live Construction	1:1	Soft	No
2A	Live Construction with Boulder Toe	1:1 if boulder toe is vegetated 1.5:1 if boulder toe is not vegetated	Vegetated: hybrid Not vegetated: hard	No
2B	Live Construction with Log Toe	1:1	Soft	No
3	Contour Wattling	1:1	Soft	No
3A	Contour Wattling with Boulder Toe	1:1 if boulder toe is vegetated 1.5:1 if boulder toe is not vegetated	Soft	No
3B	Contour Wattling with Log Toe	1:1	Soft	No
4	Brush Mattress (Brush Layering)	1:1	Soft	No
4A	Brush Mattress (Brush Layering) with Boulder Toe	1:1 if boulder toe is vegetated 1.5:1 if boulder toe is not vegetated	Vegetated: hybrid Not vegetated: hard	No
4B	Brush Mattress (Brush Layering) with Log Toe	1:1	Soft	No
5	Surface Matting (Erosion Mats)	1:1	Soft	No
5A	Surface Matting (Erosion Mats) with Boulder Toe	1:1 if boulder toe is vegetated 1.5:1 if boulder toe is not vegetated	Vegetated: hybrid Not vegetated: hard	No

5B	Surface Matting (Erosion Mats) with Log Toe	1:1	Soft	No
6	Add Rock to Invert	1:1	hybrid	No
6A	Rock Cross Vanes	1:1	hybrid	No
6B	Root Wads and Boulders	1:1	hybrid	No
6C	Live Log Crib Walls	1:1	Soft	No
6D	Log Revetment	1:1	hybrid	No
7	Cellular Confinement System	2:1	Hard	Yes
8	Rock Blanket	2:1	Hard	Yes
8A	Boulder Revetment	2:1	Hard	Yes
8B	Boulder Revetment with Soil and Vegetation	1:1	hybrid	Yes
9	Articulated Concrete Blocks	3:1	Hard	Yes
9A	Articulated Concrete Blocks with Planted Areas	2:1	Hard	Yes
10	Concrete Crib Walls	3:1	Hard	Yes
11	Sacked Concrete	3:1	Hard	Yes
12	Gunite Slope Protection	3:1	Hard	Yes
13	Earth with Rock Toe on Grass Lined Channels[a]	2:1[b]	Soft/hybrid	No

(a) Grass lined channels are those where grass is the predominant or sole vegetation, and that contain no significant riparian structure. The NPW submittal will include photographs and descriptions to justify use of this line item.

(b)- No mitigation is necessary if rock toe is placed below bankfull depth and the project includes some instream element of instream complexity.

The District favors using biotechnical techniques (as appropriate for site conditions) that use soil, vegetation, or other organic materials as a softscape approach to stabilize eroding stream banks. As shown in Table 9, softscape approaches use willow plantings, contour wattling, brush mattresses, root wads, log crib walls, and earthen soil banks to provide the benefits of effective erosion control and natural resource enhancement. When implemented, these softscape approaches are combined with additional vegetation plantings (see Table 7 – riparian planting palette) to enhance the riparian habitat along the bank.

Some of the mitigation ratios shown in Table 9 include lower ratios then the original mitigation ratios

from the 2002 SMP EIR. The rationale for lowering some bank stabilization mitigation ratios is rooted in 10 years' experience of the on-going SMP (2002-2011), where it has been observed that the resource values and functions of streambank sites requiring repair and stabilization is typically very low. Bank stabilization sites typically exhibit conditions of unstable earthen erosion, with no vegetation or vegetation of low value (such as early seral invasive vegetation colonizing the destabilized site). District biologists and geomorphologists have observed that historically, bank stabilization sites have had poor baseline conditions. Based on several years' observations of typically poor quality existing conditions at bank stabilization sites, the District is proposing to use mitigation ratios that more accurately represent the mitigation requirement for the loss of ecologic functions/values due to the maintenance activities. The District's primary concern is that the relative baseline of functions/values provided at eroded bank sites is lower than justified by the 3:1 mitigation ratios currently in use since 2002 for certain bank treatments. The proposed revised mitigation ratios, including ratios of 1:5 and 2:1 are more appropriate for the given baseline conditions. It is important to note that not all bank stabilization projects necessarily have negative impacts. Depending upon the situation, some bank stabilization projects result in a net environmental benefit when considering the functions and values of the existing bank condition (baseline) compared to the post project condition. Notably, if left untreated, eroding and destabilized streambanks will generally become progressively more severe with increased erosion and flooding risks. Beneficial bank stabilization projects, particularly approaches that use softscape or biotechnical techniques are typically "self mitigating" and do not require additional revegetation or other mitigation.

Depending on the size, functions, and values of the natural resources developed at the bank repair site, beneficial bank stabilization projects may provide mitigation credit toward future bank protection activities, or if appropriate, provide mitigation for other types of maintenance impacts. The balance of mitigation credit for bank stabilization activities, including credit that has accumulated during the current program, will be reported by watershed every year in the PCR.

As shown in Table 9, the District does retain hardscape bank stabilization treatments within the SMP for specific locations and conditions which require a higher level of resistance for erosive shear forces. For example, the softscape approaches shown in Table 9 can be combined with selective rock use (typically at the toe of the bank where erosive forces are greatest) to provide added shear strength. The outer bends of channels where flow velocities and shear stresses are greater are also common locations for using hardscape.

The District also acknowledges that certain hardscape techniques shown in Table 9 such as 9 (articulated concrete blocks), 9A (articulated concrete blocks with planted areas), 10 (concrete crib walls), and 12 (gunite slope protection) have had minimal or no application in the SMP since 2002. However, it is the preference of District staff engineers to retain such techniques in the Program in the event that specific hydraulic conditions at a bank stabilization site may require such hardscape approaches.

As stated above, the District's preference and priority is to first consider use of softscape approaches, and only use hardscape where absolutely necessary. As Table 2-3 of the SEIR suggests, softscape or hybrid bank solutions were used by the about District 77% of the time during the 2002-2010 period. As

evidenced by the District's past record of prioritizing softscape or hybrid approaches over full hardscape bank approaches (see Table 2-3), having such hardscape techniques available in the SMP does not necessarily lead the District to their use and application.

The District will continue to track and monitor the use of both softscape and hardscape bank stabilization treatments as described below. To further refine the control on the use of hardscape, the program will not install more than 50% of the total area of bank stabilization projects with hardscape. This means that the total area of all hardscape elements divided by the total area of all bank stabilization projects will not exceed 50%. This calculation results in a percent of hard elements within all bank stabilization jobs, and accurately reflects the proportion of hard and soft methods overall. Calculated in this way, the program in 2002-2010 has installed roughly 20% hardscape.

Where on-site mitigation is not feasible for bank stabilization projects, particularly for lower valued streams, mitigation will be targeted at higher valued streams. The Mitigation Feasibility Assessment (MFA) process is discussed below in Section 7.3.

Where appropriate based on site conditions, the mitigation components described in Section 5 above for sediment removal and vegetation management activities will also be used to support mitigation activities at bank stabilization project sites.

Through the SMP reporting process, the District has submitted annual PCRs to the overseeing permitting agencies since 2002, and this process will continue through 2022. These annual reports document where bank stabilization projects occur, their length, type, mitigation requirement, mitigation accounting balances, resource inventories conducted, and pre/post construction photographs. The District has also monitored and documented conditions at mitigation sites for bank stabilization projects and reported the quality and status of the mitigation sites. The District provides monitoring reports following years 1, 3, and 5 for selected bank stabilization projects (see Section 8.1 below for more detail).

Mitigation credit from excess riparian planting in watersheds over the first part of the program (2002-2012) has been consistently reported in annual PCRs. This program of apportioning credit to the appropriate locations will continue. The previously accumulated credit will be carried forward into the new program.

7.2 Mitigating for Hardscape

As discussed above, some bank stabilization sites will require hardscape treatments. It is important to note that for the treatments listed in Table 9 with hardscape elements, there is a range of actual hardened features. Some treatments have bio-technical approaches on most of the bank slope, but include a limited amount of rock to protect the toe of the bank. This mixed approach is exemplified by techniques 2A (live construction with boulder toe), 3A (contour wattling with boulder toe), 4A (brush mattress with boulder toe), and 5A (surface matting with boulder toe). Mitigation ratios for softscape solutions that have boulder toe placement are higher if the rock placement does not include plantings between rocks.

Mixed softscape/hardscape approaches enable bio-technical treatments and vegetation on most of the bank slope and are different than other more traditional hardscape approaches such as articulated concrete blocks (9), concrete crib walls (10), sacked concrete (11), gunite (12), and earth repair with buried rock (1B) which create a more uniformly hardened bank environment.

The rock toe used in grass lined channels (13) is specifically intended to provide a more stable solution in grass lined channels with higher flow velocities. Earthen banked projects in grass lined channels have historically been prone to failure. The careful placement of rock at the toe of grass lined bank repairs is intended to make them more successful. Because these channels are often lower biological value, a lower mitigation ratio is proposed for the application of rock in grass lined channels. Application of this method is subject to annual approval.

Revegetation will occur according to the mitigation ratios shown in Table 9. Revegetation requirements are calculated by the square footage of the bank stabilization project. Revegetation plantings will be incorporated into the site as appropriate to the stabilization design and the existing site conditions (see Mitigation Feasibility Assessment discussion in Section 7.3 below). While revegetation is currently used as the predominant mitigation method for bank stabilization sites, the other mitigation approaches described in this memo would also provide mitigation. For the hardened bank stabilization areas that cannot be directly planted, additional mitigation will be necessary. Additional mitigation may also be provided through installing instream complexity features in the channel adjacent to the bank stabilization project (see Section 5.6 above).

Stream functions and habitat values that require mitigation due to hardscape include:

- Loss of instream escape cover provided by undercut banks, large boulders, tree roots, downed trees, and other structural elements; (instream complexity)
- Reduction in hydraulic variation and complexity due to flow interaction non-hardened banks;
- Loss of velocity refuge provided by earthen features along the bank;
- Loss of shading and water temperature moderation provided by mature riparian shrubs and trees; and/or
- Loss of overhanging escape cover provided by shrubs and grasses near the stream edge.

Potential impacts to special status aquatic species are described in the SMP SEIR. As necessary, mitigation to these aquatic species due to bank stabilization projects will be provided through species specific mitigation that will be assessed annually (see Section 6 above).

7.3 Mitigation Feasibility Assessment (MFA) – Revegetation Component

One of the important lessons learned from implementing the SMP during 2002-2010 is that the success criteria for revegetation mitigation projects should carefully consider existing site conditions and constraints. The Mitigation Feasibility Assessment (MFA) process was designed to provide a consistent assessment methodology that can guide mitigation design and success criteria based on what type,

degree, and quality of revegetation the site will support.

The MFA process begins with a broad evaluation of the existing conditions at the mitigation site. Depending upon which bank treatment will be used, the target mitigation site may be at the same location where the bank stabilization work will occur, or it may occur at an off-site location. The MFA assessment includes evaluating site hydrology, flow velocity, soils and soil moisture, aspect, slope, adjacent land use, site access, presence of invasives, presence of rare/listed species, maintenance needs, animal damages, human activity, and the potential revegetation design. Based on this assessment the site is categorized as having either a high, medium, or low revegetation potential. Each of these categories is based on the presence or absence of existing opportunities and constraints at the site. Planting species appropriate to the site conditions can promote a more successful and efficient revegetation program. If a site is identified as having poor conditions yet is still desirable to plant, lower success criteria will be established to account for the poorer site conditions. This will enable some replanting prior to seeking off-site mitigation. If the MFA identifies the project location as a highly constrained site, then off-site mitigation will be considered to ensure greater revegetation success.

The MFA process is designed to provide ecologically feasible mitigation success criteria, given site specific conditions and the proposed revegetation palette. The District may support revegetating a highly constrained creek bank that will rarely meet typical success criteria. Therefore, lower success criteria will be allowed to facilitate replanting on ecologically challenging sites. Project sites with fewer constraints will meet standard success measures more easily and will continue to be held to those higher standards. The MFA approach will be formalized to provide the District with flexibility to revegetate a broader range of sites without committing to futile replanting efforts. The MFA approach is based on the experience gained through planting several constrained bank stabilization sites during the 2002-2012 period.

8. Mitigation Monitoring and Reporting

8.1 Monitoring

This section describes monitoring approaches for the mitigation programs discussed above. The proposed mitigation monitoring and reporting program builds on the existing monitoring program. All monitoring programs are intended to be adaptively managed and implemented in conjunction with input and support from regulatory agencies. Monitoring reports will be provided to the resource agencies.

Monitoring Protocols

Since the SMP inception in 2002 the District has developed surveying and monitoring protocols as part of the routine implementation of the program. The District conducts annual field inspections of their streams to determine the needs for maintenance activities. They track all maintenance activities conducted by stream reach, and all restoration and mitigation efforts implemented to address maintenance impacts. The District maintains an extensive database, including a GIS mapping database, to document and track annual maintenance and mitigation activities. The District's existing monitoring

protocols and corresponding databases will meet the monitoring needs of the updates to the mitigation program as described in this memorandum. For proposed new mitigation efforts not directly addressed by an existing monitoring protocol (or entry into the existing database system), the District will expand the database and develop monitoring protocols.

Monitoring requirements for species-specific mitigation projects will be refined as directed by regulatory permit conditions and guidance.

Bank Stabilization Monitoring

Each year in the NPW, the District will identify bank stabilization sites to be monitored in years 1, 3, and 5 after construction. The monitoring sites will include 50% of the bank stabilization sites implemented in the Pajaro Watershed (Central Coast Regional Board) and up to 10 other sites per year from the 4 other watersheds in the Santa Clara Basin (San Francisco Bay Regional Board). Monitoring reports for bank stabilization sites will be submitted for the duration of the program period (2012-2022) for a total of 60 sites and 180 reports in the Santa Clara Basin. This monitoring will include a visual observation erosion conditions upstream and downstream of the site (i.e., 200 feet), conditions of the bank stabilization repair, and conditions of vegetation planting. In addition, 2 sites per year in the Santa Clara Basin will be selected for additional monitoring of peak flows and water levels during storm events. Bank stabilization monitoring reports will be submitted to resource agencies annually.

Duration of Revegetation Mitigation Monitoring

Monitoring revegetation mitigation project sites that involve restoration plantings will be conducted for five (5) years following planting, or until success criteria are met. Success criteria will be determined though the Mitigation Feasibility Assessment (MFA) as described above in Section 7.3. Information collected on restoration plantings will include the number and species planted at each site, square footage of area planted, estimated percent canopy cover, number or percent of planted trees and shrubs surviving, and observations on whether recolonization of invasives occurs after removal. Note that percent cover canopy will not be reported likely until year 5 or at which time canopy has developed significantly enough to describe.

Instream complexity and gravel augmentation projects will be monitored annually up to five years, to evaluate and describe their functioning.

Selected bank stabilization projects will be monitored following years 1, 3, and 5 and will be reported on annually. Post construction monitoring efforts will enable the District to evaluate the success of each bank stabilization project.

Success Criteria for Plantings

Success criteria for shrubs and trees planted in riparian areas above bank repair sites will be determined though the MFA process (Section 7.3). In the event of poor plant survival, corrective measures will include replanting to reach the pre-determined success criteria, via the MFA, as needed based on scheduled monitoring activities. Such remedial measures will be monitored for a 5-year period following implementation to ensure that the project is successful. For instance, if remedial activities

were taken during the fifth year after project implementation, monitoring of these remedial measures would continue until year 10. If they did not meet success criteria at that point, additional measures would be required or new mitigation would be provided elsewhere should a project not be capable of meeting success criteria.

Success criteria for bank stabilization and riparian planting and revegetation projects are described in the Mitigation Feasibility Assessment implementation document.

Success Criteria for Invasive Plant Management

In areas where the District conducts invasive plant management mitigation activities the District will monitor conditions in years 1, 3, and 5 following mitigation. The success criterion for invasive plant management mitigation will be species specific to ensure the appropriate control method, timing, and frequency. Control work for certain invasive species may require several years of treatment to be effective. Repeat invasive plant management mitigation activities, within a two-year period will be accounted toward the original mitigation requirement. Following two years, if additional repeat invasive removal work is necessary, then the site will become available to be counted as mitigation for new SMP maintenance activities (at a 50% rate for the patch area).

Success criteria will be developed for each site based on site specific conditions and target species. Many interconnected factors go into determining the level of success that can be expected. Each proposal for invasive management will be negotiated annually and will include the following elements:

1. Description of the target species including the suggestions for an optimal management approach based on the available published literature and local professional expertise.
2. Discussion of site constraints as certain sites may have limitations in the techniques that can be used for invasive plant management due to regulatory and/or ESA concerns.
3. Discussion of control timeframes and strategies. Different species require different repeat treatments to be effective. Therefore, the success strategy might be laid out over a period of time for difficult to control species.
4. Discussion of site specific success strategies. Adjacent invasive plant populations will have a significant effect on individual site success. It might be desirable to manage an invasive plant at a particular site, but if there is an adjacent invasive population that is off of District property, the potential for success is less. However, it might still be desirable to treat the invasive with a containment strategy. For example, maintaining a pickleweed population with lepidium all around it.

8.2 Mitigation Reporting

Mitigation planning, design, implementation, and monitoring activities will be notified and reported to the relevant permitting agencies through the course of the regular program communications, including

submittal of the SMP annual Notice of Proposed Work (NPW) and Post-construction Report (PCR). These reports will include a discussion of mitigation activities associated with the SMP. The District will also annually complete a Wetland Tracker Form[7] to provide information on maintenance work in wetland locations.

Mitigation information to be included in the NPW will include a description of mitigation activities planned for the coming year including locations, lengths, areas, and other project details. The NPW will also include a schedule for implementing mitigation activities and a statement describing the status of permit approvals necessary to perform the project (if applicable). As needed, reporting for land acquisition and restoration projects will include a description of how the proposed off-site mitigation will address SMP related impacts. Table 10 provides an example summary mitigation notification table that will be included in the annual NPW to identify, notify, and track the given year's proposed mitigation projects.

Permitting agencies will have the opportunity to review and comment on the proposed annual mitigation approach. The annual mitigation activities will be consistent with the mitigation approaches and requirements described in this document and the SMP Manual.

Each year, the District will submit a PCR on SMP activities including summary descriptions of the maintenance activities conducted in the past year. The annual report will also include status reporting on the program's mitigation activities, including the submittal of follow up monitoring reports from previous mitigation projects. Table 11 provides an example mitigation summary table that will be included with the annual PCR to identify and track the given year's mitigation projects, as well as the status of other mitigation projects that require on-going reporting. The mitigation activity section of the PCR will include a comparison with success criteria, and describe efforts to meet those criteria. Individual tree replacement planting for the removal of 6-12 inch dbh trees will be reported annually through the PCR.

Reporting requirements will apply according to the duration of monitoring requirements, as described above. Once projects have fulfilled the 5-year monitoring requirement and meet the appropriate success criteria, they would no longer need to be reported in the annual PCR.

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[7] *The Wetland Tracker (www.californiawetlands.net) provides free public access to information about the location, size, sponsors, habitats, contact persons, and status of wetland restoration, mitigation, creation, and enhancement projects in the San Francisco Bay Area. It also provides information on the location and condition of wetlands around the state. The San Francisco Regional Water Quality Control Board has integrated the Wetland Tracker into its regulatory process, and completion of the Wetland Tracker form is now a condition for 401 permitting. The Wetland Tracker has been integrated into the wetlands portion of the State Water Resources Control Board.*

Table 10. Example Mitigation Notification Provided in Annual Notice of Proposed Work (NPW)

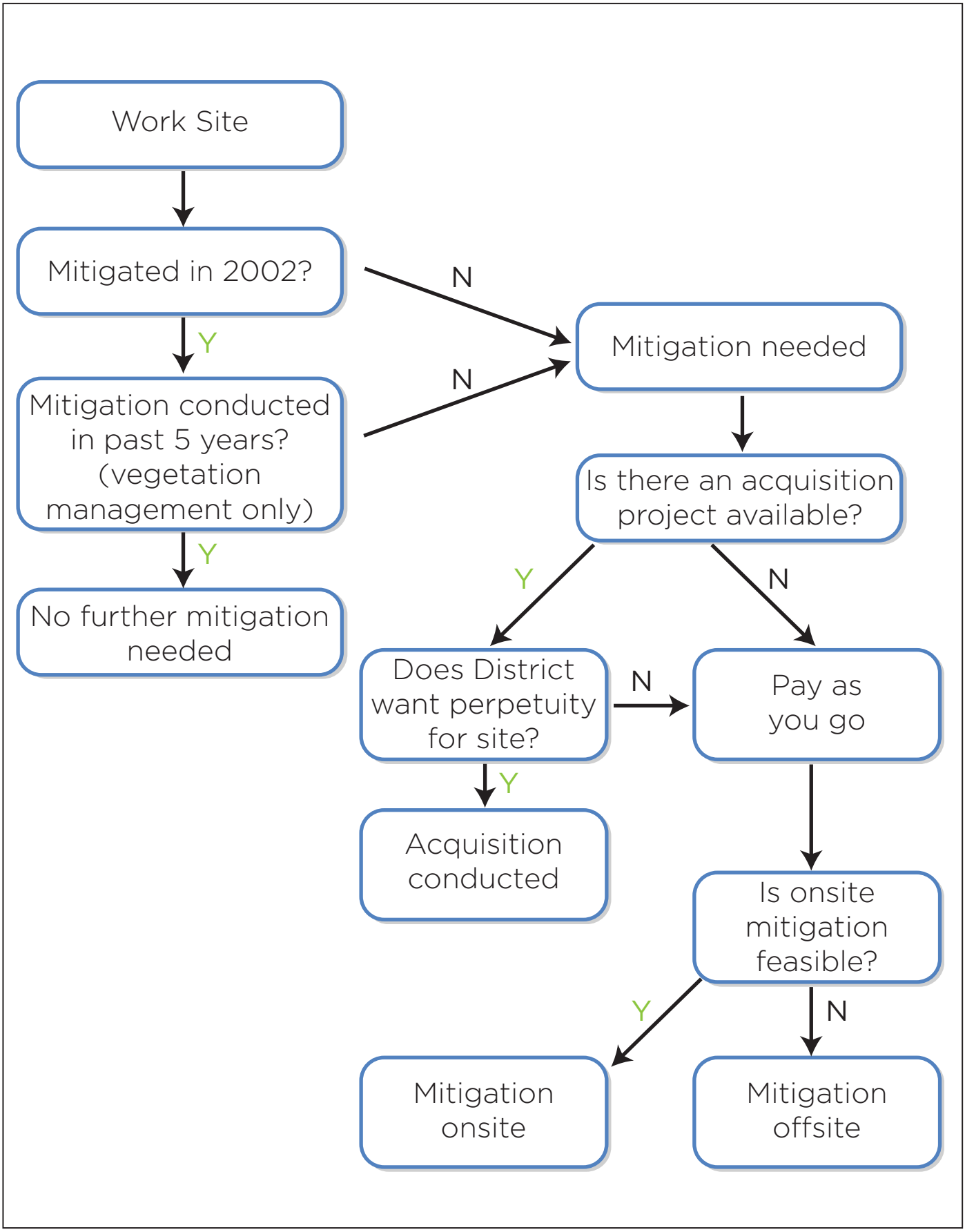
20XX Project List	**Total Project Length** (ft)	**Total Project Area** (ac)	**Potential Impact to Freshwater Wetlands** [8] (ac)	**Potential Impact to Tidal Wetlands**[1] (ac)	**Potential Impact to Riparian Habitat** [9] (ac)	**Potential Impact to Instream Features** [10] (ac)	**Impacts Covered by 2002 Mitigation Program, or through other land acquisition, or (for vegetation management activities) has location been previously mitigated in last 5 years?** (Y/N)	**If NO, were Impacts Projected for 2012-2022?** (Y/N)	**Onsite Mitigation** (Type and area restored)	**Offsite Mitigation or Acquisition** (Type and area restored)
Sediment Removal										
Sed Project 1		0.02	0.02		-	N/A	Y			
Sed Project 2		1.0	1.0	-	-	N/A	N	Y	Invasive Plant Management (1.2 ac treated at 1.2:1 ratio)	
Sed Project 3		0.6	0.3		-	-	N	N, however impacts consistent with CEQA/permit documents (an assessment would be attached for agency review/approval)		Acquisition in-kind preservation/enhancement (0.9 ac at 3:1 ratio)
Sed Project 4		0.75	0.5				N	Y		Acquisition In-kind restoration (0.75 ac acquired at 1.5:1 ratio)
Sed Project 5		0.52	0.5	-		0.02	N	Y	Riparian Planting (0.6 ac planted at 1.2:1 ratio) Instream new LWD feature (0.02 ac at 1:1 ratio)	
Total 2002 Program		0.02	0.02	-	-	-			-	-
Total 2012 Program		2.87	2.3		-	0.32			Invasive Plant Management: 1.2 ac Riparian Planting: 0.6 ac Instream LWD: 0.02 ac	Acquisition in-kind preservation/enhancement: 0.9 ac acquired Acquisition In-kind restoration: 0.525 ac acquired
Vegetation Management[11]										
Veg Project 1		1.0	0.2		0.8		Y	-	-	-
Veg Project 2		2.5	0.5		2.0		N	Y	Riparian Planting (3 ac at 1.2:1 ratio) Individual Tree Planting for removal of trees 6-12"dbh (15 trees planted[5])	
Veg Project 3		1.54	0.04		1.5		N	Y	Riparian Planting (1.5 ac at 1.2:1 ratio) Invasive Plant Management (0.348 ac treated at 1.2: ratio)	
Total 2002 Program		1.0	0.2		0.8				-	-
Total 2012 Program		4.04	0.54		3.5				Riparian Planting: 4.5 ac Invasive Plant Management: 0.6 ac treated Trees planted (15)	-

[8] Wetland Impacts include: Aquatic, Herbaceous, and Sediment wetlands, as projected in impact Tables 5 and 6 for tidal and non-tidal stream reaches.
[9] Riparian Habitat Impacts include: Woodland, Herbaceous (non-wetland), and Shrub impacts, as projected in impact Tables 5 and 6 for tidal and non-tidal stream reaches.
[10] Instream Features include presence of "high quality" large woody debris, deep pools, cobble/boulder features, and potential spawning gravel, as determined according to the protocols described in Section 5.6 and 6 (gravel augmentation discussion).
[11] Vegetation management activities requiring mitigation are: herbicide application, hand removal, discing, mowing, and hand pruning.
[5] Replacement tree planting based on mitigation requirements/ratios described in Appendix C, *Tree Scoring for Removal of Trees and Shrubs*

Table 11. Example Annual Mitigation Tracking Provided in Annual Post Construction Report (PCR)

20XX Mitigation Project Types	Mitigation Project Name	Description	Total Onsite Mitigation Completed	Total Offsite Mitigation Completed
Land Acquisition (in-kind preservation/enhancement)	Project 1	Covers Stream Reaches A1 and A2		0.9 ac
Land Acquisition (in-kind restoration)	Project 2	Covers Stream Reach B3		0.525 ac
Land Acquisition (watershed lands out-of-kind)	NA	NA		
Invasive Plant Management Program	Creeks X and Y	Blackberry removal	1.8 ac	
Riparian Planting and Restoration	Creeks R and S	Native XX species planted	4.5 ac	
Tree Planting	Creek M	Native XX tree species planted	15 trees	
Instream Complexity	Creek T	New LWD Structure	0.2 ac	

Ongoing Monitoring of Mitigation Projects (2012 – current)	Project Name	Description	Monitoring Year	Comments
Invasive Plant Management Program	Creek X	Blackberry removal and revegetation conducted in 20XX	1 of 5	
	Creek XX	Arundo removal and revegetation conducted in 2014	3 of 5	Site in good condition
	Creek XXX	Blackberry removal and revegetation conducted in 2012	5 of 5	Site meets success criteria
Riparian Planting and Restoration	Creek R	Native XX species planted	1 of 5	
	Creek S	Native species planted at bank stabilization project XX	1 of 5	
	Creek XXX	Native XX species planted	3 of 5	5 plants required replanting
Tree and Shrub Planting	Creek M	Native XX tree species planted	1 of 5	
Instream Complexity	Creek T	New LWD Structure	1 of 5	



Horizon WATER and ENVIRONMENT

Figure 1
SCVWD SMP Decision Making Process to Identify and Prioritize Mitigation During the 2012-2022 Program Period

Appendix B: Vegetation Classification

Formation Class	Formation	Macrogroup	Alliance Id	Wetland	Alliance
Hydromorphic Vegetation (Aquatic Vegetation)	Freshwater Aquatic Vegetation	8100 - Western North American Freshwater Aquatic Vegetation	8100	Y	Naturalized Temperate Pacific Freshwater Vegetation
Mesomorphic Forests & Woodlands	Cool Temperate Forests	Californian-Vancouverian Montane & Foothill Forest	1200	N	Vancouverian Evergreen Broadleaf & Mixed Forests &
			1210	N	Arbutus menziesii
			1211	N	Lithocarpus densiflorus
			1212	N	Pseudotsuga menziesii – Lithocarpus densiflorus
			1300	N	Upland Vancouverian Mixed Woodland & Forests Group
			1310	N	Pseudotsuga menziesii
			1311	N	Acer macrophyllum
		Vancouverian Rainforest	1400	N	Vancouverian Hypermaritime Lowland Rainforest Group
			1410	N	Sequoia sempervirens
	Exotic Woodland	Exotic Woodland	100	N	Exotic Trees Group
			101	N	Exotic Trees, Canopy Height < 2 Meters
			102	N	Exotic Trees, Canopy Height 2-15 Meters
			103	N	Exotic Trees, Canopy Height > 15 Meters
			110	N	Eucalyptus
	Temperate Flooded Forests	Southwestern North American Riparian, Flooded, & Swamp Forest/Scrubland	3200	N	Southwestern North American Riparian Evergreen & Deciduous Woodlands Group
			3210	N	Populus fremontii
			3211	N	Salix laevigata
			3212	N	Salix gooddingii
			3213	N	Platanus racemosa
			3214	N	Acer negundo
			3215	N	Juglans hindsii Semi-Natural Stands
		Western Cordilleran Montane-Boreal Riparian Scrub	3100	N	Vancouverian Riparian Deciduous Forests Group
			3110	N	Alnus rhombifolia

Appendix B: Vegetation Classification

	Warm Temperate Forests	California Forests & Woodlands	1100	N	California Broadleaf Forests & Woodlands Group
			1110	N	Quercus chrysolepis
			1111	N	Umbellularia californica
			1112	N	Quercus agrifolia
			1113	N	Aesculus californica
			1114	N	Quercus kelloggii
			1115	N	Quercus lobata
			1116	N	Quercus douglasii
Mesomorphic Herbaceous Vegetation	Mediterranean Grassland & Forb Meadow	California Perennial & Annual Grasslands	7100	N	California Perennial & Annual Grasslands Mapping Unit Group (Native component)
			7110	N	Serpentine component mapping unit
			7200	N	Mediterranean California Naturalized Annual & Perennial Grassland Group (Weedy grasslands with no na)
			7201	N	Conium-Foeniculum patches
		Western North America Temperate Grassland & Meadow	7300	N	Western Dry Upland Perennial Grassland Group
			7301	N	Lolium multiflorum
	Temperate & Boreal Freshwater Marsh	North American Pacific Coastal Salt Marsh	7800	Y	Temperate Pacific Tidal Salt and Brackish Meadow Group
			7801	Y	Salicornia
			7802	Y	Salicornia - Salt Grass - Jaumea
			7803	Y	Chord Grass
			7804	Y	Scirpus maritimus
			7805	Y	mixed bulrush spp. (Scirpus californicus and S. robustus)
			7806	Y	Scirpus robustus
			7807	Y	Scirpus californicus
			7808	Y	bulrush/cattail mix
			7810	Y	Typha (angustifolia, latifolia, domingensis)
			7820	Y	brackish/tidal bulrush spp. mapping unit
			7830	Y	brackish/tidal Bulrush-Cattail mapping unit
			7900	Y	Southwestern North American Salt Basin and High Marsh Group
		Western North	7700	Y	Naturalized Warm-Temperate Riparian & Wetland Group

		America Wet Meadow & Low Shrub Carr	7701	Y	Lepidium latifolium
		Western North American Freshwater Marsh	7400	Y	Freshwater Wet Meadow Mapping Unit Group (Meadow vegetation)
			7500	Y	Arid Freshwater Emergent Marsh Group (Marsh vegetation)
			7510	Y	Typha (angustifolia, latifolia, domingensis)
			7520	Y	Fresh or brackish bulrush spp. mapping unit
			7530	Y	Bulrush - Cattail mapping unit
		Western North American Vernal Pools	7600	Y	Californian Mixed Annual/Perennial Freshwater Vernal Pool/Swale/Plain Bottomlands Group
			7601	Y	Eleocharis macrostachya, Downingia, Trifolium variegatum, Eryngium
Mesomorphic Shrub Vegetation	Mediterranean Scrub	California Chaparral	4100	N	Californian Xeric Chaparral Group
			4111	N	Arctostaphylos glauca
			4112	N	Adenostoma fasciculatum
			4200	N	Californian Mesic Chaparral Group
		California Coastal Scrub	4300	N	Central & South Coastal Californian Coastal Sage Scrub Group
			4310	N	Artemisia californica
	Temperate & Boreal Scrub & Herb Coastal Vegetation	Vancouverian Coastal Dune & Bluff	4400	N	California Coastal Evergreen Bluff & Dune Scrub Group
			4410	N	Baccharis pilularis
		Vancouverian Lowland Grassland & Shrubland	4500	N	Naturalized Non-native Deciduous Scrub Group
			4510	N	Rubus discolor
			4600	N	Vancouverian Coastal Deciduous Scrub Group
			4610	N	Toxicodendron diversilobum
	Temperate Flooded Scrubland	Southwestern North American Riparian & Flooded Swamp Scrubland	3300	N	Southwestern North American Riparian/Wash Scrub Group
			3310	N	Salix lasiolepis
			3311	N	Salix exigua
			3312	N	Baccharis salicifolia
			3313	N	Sambucus nigra (lumped with Mexican elderberry)

			3400	N	Southwestern North American Introduced Riparian Scrub Group
			3401	N	Arundo donax
			3402	N	Tamarix
Miscellaneous Class	Lithomorphic, Anthropogenic & Water	Lithomorphic, Anthropogenic & Water	9200	N	Agriculture Group (Without fallow annual grasses dominating)
			9201	N	Row Crops
			9202	N	Vineyards
			9203	N	Orchards
			9204	N	Other Agriculture including related disturbance
			9300	N	Built up & Urban Disturbance Group
			9301	N	Roads
			9400	N	Areas of Little or No Vegetation Group
			9401	N	Cliffs & Rock Outcroppings
			9402	N	River & Lacustrine Flats & Streambeds
			9403	N	Earth Lined Channels
			9404	N	Concrete Lined Channels
			9405	N	Fence Row
			9406	N	Landscaping
			9800	N	Water Group
			9801	N	Perennial Stream Channel
			9802	N	Reservoirs
			9803	N	Small Earthen Dam Ponds and Natural Lakes
			9999	N	Unknown Type Group (flagged for field)

Appendix C

Tree Scoring for Removal of Trees and Shrubs ≤ 12"DBH
April 5, 2011

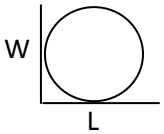
Trees up to 12" dbh may be removed under the Stream Maintenance Program 2012-2022. The sum value from the assessment of four (4) attributes will provide a mitigation ratio for the trees/shrubs proposed for removal. Trees >12" dbh are not included as a part of this removal program.
High scores equate to higher value trees, with greater potential impacts if they are removed; and therefore, will require more mitigation. Low scores equate to lower value trees, having fewer potential impacts if they are removed; and therefore, require lower mitigation.

A. Approach

Tree replacement would start with a baseline ratio of 1:1. Replacement ratios would increase or decrease based on specific ecological attributes of the individual(s) to be removed and the setting in which it is/they are located.
Scoring would add to or subtract from the baseline ratio. Final ratios would be calculated using the methodology outlined below.

B. Ranking

1. Canopy cover
   a) Square footage of canopy is measured at the drip-line of the subject tree.
   b) Grouping or stands of trees are calculated as the summation of each individual tree canopy, even if the canopies overlap. Open space between the trees would not be factored into the square footage calculation.
   c) Calculations may be made on approximations (+/- 5 feet) with areas converted to measurable geometry. Width x length = square footage. (Estimating by a triangle or circle is also acceptable.)
   d) 0-100 sq. ft. is ranked 0 as the baseline from which mitigation starts is 1:1



Metric: Choose 1. Assess at widest dripline extension point and square that value.

Attribute	**Score**
0-100 Square Feet of Canopy (< 10' diameter)	0 points
101-400 Square Feet of Canopy (10 - 20' diameter)	+ 1 points
>401 Square Feet (> 20' diameter)	+ 2 points

0-2 points

2. Local Area Value
   a) Is the affected vegetation unique to its geographic location based on a measurable attribute (species, size, structure, absence of adjacent comparable vegetation).
   b) There is a 2000 sq ft maximum for removal of a stand of trees.

Metric: Choose all that apply. Score = 0 if none of these apply.

Attribute	**Score**
Native Species	+1 point
No similar vegetation within 500 feet radius (Size of canopy, height, or similar measurable	+1 point

criteria; even if non-native).	
Stand Reduction (Removal of target trees would reduce stand by more than…)	+1 point for 20-50% reduction +2 points for greater than 50% reduction

0-4 points

3. Ecosystem Benefits (wildlife, fisheries, streams)
   a) Tree used by wildlife. Examples include: cavity nesting, nectar feeders, high wildlife food value (seeds, fruits, flowers), cavities and crevices for bats, dead wood for woodpeckers and insect feeders, perching, roosting, nesting, etc. This will rarely ever be zero.
   Supports macroinvertebrate and biomass decomposition processes.
   b) Provides structure/cover : Nurse tree, horizontal or vertical cover.
   c) Provides SRA: Shaded Riverine Aquatic, ≤ 15 ft from the water's edge or overhangs water, shade, roots or branches in water providing habitat for fish and aquatic organisms, could contribute instream woody debris.
   d) Tree is 6-12" dbh, provides more mature structure and life form to the surrounding environment.

Metric: Choose all that apply.

Attribute	**Score**
Used by wildlife	+ 1 point
Structure/Cover (vertical, horizontal)	+ 1 point
SRA	+ 1 point
Tree is 6-12" dbh (life form)	+ 1 point

1-**4 points**

4. Ecosystem Detriments

   a) Tree has ecologically undesirable attributes.
   b) Ecological arboriculture would include a tree failing to thrive with little or no hope of recovery.
   Note: this distinguishes between tree removals that may benefit the ecological setting versus hazard trees.

Metric: Choose all that apply. Score = 0 if none of these apply.

Attribute	**Score**
Significant structural defects	-1 point
Non-native species OR Invasive species	-1 point OR -2 points
Removal for ecological arboricultural reasons (diseased, infestation), excludes hazard trees	-1 point

-4-0 points

C. Mitigation Calculation

Baseline is 1:1 ratio for trees impacted in this size class.
Point reductions could result in a final score that reduces the ratio to less than 1:1.

Attributes	**Min.**	**Max.**
Vegetation Cover	0	2
Local Area Value	0	4
Ecosystems Benefits	1	4
Ecosystems Detriments	-4	0
Total Range	**-3**	**10**

Attribute Range	**Mitigation Ratio**
-3 - 2	1:1
3 - 5	2:1
6 - 10	3:1

Appendix C

Tree Scoring for Removal of Trees and Shrubs ≤ 12" dbh

Site Location_____ Species_____
Assessors Name_____ DBH_____
Date_____ Canopy Cover sq ft_____
ESU #_____ Reason for Removal_____

1. Canopy cover

Metric: Choose 1. Assess at widest dripline extension point.

Attribute	Score
0-100 Square Feet of canopy cover (< 10' diameter)	0 points
101-400 Square Feet of canopy cover (10-20' diameter)	+ 1 points
>401 Square Feet (> 20' diameter)	+ 2 points

0-2

Vegetation Cover
Score:_____

Stand maximum = 2000 sq ft

2. Local Area Value

Metric: Choose all that apply. Score = 0 if none of these apply.

Attribute	Score
Native Species	+1 point
No similar vegetation within 500 feet radius (Size of canopy, height, or similar measurable criteria; even if non-native).	+1 point
Stand Reduction (Removal of target trees would reduce stand by more than:…..)	+1 point for 20-50% reduction +2 points for greater than 50% reduction

0-4

Local Area Value
Score:_____

3. Ecosystem Benefits (wildlife, fisheries, streams)

Metric: Choose all that apply.

Attribute	Score
Used by wildlife	+ 1 point
Structure/Cover (vertical, horizontal)	+ 1 point
SRA	+ 1 point
Tree is 6-12" dbh (life form)	+ 1 point

1-**4**

Ecosystem Benefit
Score:_____

4. Ecosystem Detriments

Metric: Choose all rows that apply. Score = 0 if none of these apply.

Attribute	Score
Significant structural defects	-1 point
Non-native species or Invasive species	-1 point or -2 points
Removal for ecological arboricultural reasons (diseased, infestation) excludes Hazard trees	-1 point

-4 – **0**

Ecosystem Detriment
Score:_____

Appendix C

C. Mitigation Calculation

Attributes	min	max
Vegetation Cover	0	2
Local Area Value	0	4
Ecosystems Benefits	1	4
Ecosystems Detriments	-4	0
Total Range	**-3**	**10**

Total 4 Attributes
Score:_____

Attribute Range	Mitigation Ratio
-3 - 2	1:1
3 - 5	2:1
6 - 10	3:1

Mitigation Ratio:_____

Canopy Cover sq ft **X** Ratio quotient = Amount Owed

_____

Appendix D
GENERAL PLAN POLICIES AND ORDINANCES

Appendix D
GENERAL PLAN POLICIES AND ORDINANCES

This appendix provides general plan policies and regulations, and public agency ordinances related to Santa Clara County and jurisdictions in the Project Area.

Management of Open Space and Habitats

The following resource management entities in Santa Clara County help govern the protection of open space and the habitats and species that occupy them:

- The **Guadalupe-Coyote Resource Conservation District** (GCRCD) is a public agency established by the state legislature and partially funded by property taxes collected within the agency's jurisdiction. The purpose of the GCRCD is to conserve resources by promoting sustainable agriculture including rangeland management practices for the preservation of species diversity and proper watershed management of wetlands and riparian corridors.

- The **Midpeninsula Regional Open Space District** (MPROSD) is an independent special district that works to form a continuous greenbelt of permanently preserved open space by linking its lands with other public parklands and establishing regional trail systems.

- The **Santa Clara County Open Space Authority** is an independent special district, whose jurisdiction is all of Santa Clara County with the exception of lands and communities within the boundaries of MPROSD and the City of Gilroy.

- The **Santa Clara Valley Habitat Plan** is a combination of a habitat conservation plan required under federal law and a natural community conservation plan required under state law. The purpose of the Habitat Plan is to obtain, for a 50-year period, permits from state and federal wildlife agencies for impacts to listed and potentially listed endangered species. More information also see Section 3.3, *Biological Resources*.

General Plans

General Plans are long-range comprehensive plans developed for cities and counties that govern growth and development (see Chapter 7, *References*, for all general plans, under Section 3.8 Land Use and Planning. The Project Area is located in Santa Clara County. Although Santa Clara County includes many cities and towns, this analysis focuses on those municipalities directly affected by Proposed Project activities. The following section reviews key land use policies in the General Plans of Santa Clara County as well as the cities of Campbell, Cupertino, Gilroy, Los Altos, Town of Los Altos Hills, Town of Los Gatos, Milpitas, Monte Sereno, Morgan Hill, Mountain View, Palo Alto, San Jose, Santa Clara, Saratoga, and Sunnyvale, all of which are relevant to the SMP Update.

Santa Clara County (1994)

Cultural Resources

Definition of Heritage Resources

Heritage resources are those particular types of resources, both natural and man-made, which due to their vulnerability or irreplaceable nature deserve special protection if they are to be preserved for current and future generations.

The types of resources addressed as heritage resources include:

- historical sites, structures, and areas;
- archeological and paleontological sites and artifacts; and
- historical and specimen trees.

Policies

C-RC 49 Cultural heritage resources within Santa Clara County should be preserved, restored wherever possible, and commemorated as appropriate for their scientific, cultural, historic and place values.

C-RC 50 Countywide, the general approach to heritage resource protection should include the following strategies:

1. Inventory and evaluate heritage resources.
2. Prevent or minimize adverse impacts on heritage resources.
3. Restore, enhance, and commemorate resources as appropriate.

C-RC 51 Inventories of heritage resources should be maintained as the basis for local decision-making regarding such resources.

C-RC 52 Prevention of unnecessary losses to heritage resources should be ensured as much as possible through adequate ordinances, regulations, and standard review procedures. Mitigation efforts, such as relocation of the resource, should be employed where feasible when projects will have significant adverse impact upon heritage resources.

Implementation Recommendations

C-RC(i)24 Update inventories and evaluations of heritage resources. Survey resources as necessary to augment existing inventories.

Rural Unincorporated Area Policies

R-RC 1 Natural and heritage resources shall be protected and conserved for their ecological, functional, economic, aesthetic, and recreational values.

R-RC 2. Heritage resources shall be preserved to the maximum extent possible for their scientific, cultural, and "sense of place" values.

R-RC 81 Heritage resources within the rural unincorporated areas of Santa Clara County shall be preserved, restored wherever possible, and commemorated as appropriate for their scientific, cultural, historic and place values.

R-RC 85 No heritage resource shall knowingly be allowed to be destroyed or lost through a discretionary action (zoning, subdivision site approval, grading permit, building permit, etc.) of the County of Santa Clara unless:

a. the site or resource has been reviewed by experts and the County Historic Heritage Commission and has been found to be of insignificant value; or
b. there is an overriding public benefit from the project and compensating mitigation to offset the loss is made part of the project.

R-RC 86 Projects in areas found to have heritage resources shall be conditioned and designed to avoid loss or degradation of the resources. Where conflict with the resource is unavoidable, mitigation measures that offset the impact may be imposed.

R-RC 90 Heritage and old growth trees, particularly redwoods, should not be cut, except in instances where public safety is jeopardized.

Parks and Recreation Chapter

<u>Trails and Pathways</u>

Strategy #4: Adequately Operate and Maintain Trails

C-PR 30 Trails shall be temporarily closed when conditions become unsafe or environmental resources are severely impacted. Such conditions could include soil erosion, flooding, fire hazard, environmental damage, or failure to follow the specific trail management plan (see Countywide Trails Master Plan - Design and Management Guidelines).

Strategy #6: Facilitate Inter-Jurisdictional Coordination

C-PR 33.5 Public improvement projects, such as road widenings, bridge construction, and flood control projects that may impact existing or proposed trails should be designed to facilitate provision of shared use.

<u>Scenic Highways</u>

Strategy #2: Protect Scenic Highway Corridors

C-PR 37 The natural scenery along many of Santa Clara County's highways should be protected from land uses and other activities which would diminish its aesthetic beauty.

Resource Conservation Chapter

Overall Resource Management Strategies:

Strategy #1: Improve and update current knowledge of resources

Strategy #2: Emphasize pro-active, preventive measures

Strategy #3: Minimize or compensate for adverse human impacts

Strategy #4: Restore resources where possible.

Water Quality and Watershed Management

Strategy #1: Reduce Non-Point Source Pollution

C-RC 18 Water quality countywide should be maintained and improved where necessary to ensure the safety of water supply resources for the population and the preservation of important water environments and habitat areas.

C-RC 19 The strategies for maintaining and improving water quality on a countywide basis, in addition to ongoing point source regulation, should include:

b. restoration of wetlands, riparian areas, and other habitats which serve to improve Bay water quality; and

c. comprehensive Watershed Management Plans and "best management practices" (BMPs).

C-RC 20 Adequate safeguards for water resources and habitats should be developed and enforced to avoid or minimize water pollution of various kinds, including:

a. erosion and sedimentation;

b. organic matter and wastes;

c. pesticides and herbicides;

g. industrial wastewater discharges;

h. hazardous wastes; and

C-RC 21 Multi-jurisdictional, countywide programs and regulatory efforts to address water pollution problems should have the full support and participation of each jurisdiction within Santa Clara County, including cities, special districts, state and federal agencies, and County government.

C-RC 22 Countywide, compliance should be achieved with the requirements of the National Pollution Discharge Elimination System (NPDES) permit for discharges into S.F. Bay, and to that end, the Countywide Nonpoint Source Pollution Control Program should receive the full support and participation of each member jurisdiction.

Strategy #2: Restore Wetlands, Riparian Areas, and Other Habitats That Improve Bay Water Quality

C-RC 25 Wetlands restoration for the purpose of enhancing municipal wastewater treatment processes, improving habitat and passive recreational opportunities should be encouraged and developed where cost-effective and practical.

Habitat and Biodiversity

Strategy #1: Improve Current Knowledge and Awareness of Habitats and Natural Areas

C-RC 27 Habitat types and biodiversity within Santa Clara County and the region should be maintained and enhanced for their ecological, functional, aesthetic, and recreational importance.

C-RC 28 The general approach to preserving and enhancing habitat and biodiversity countywide should include the following strategies:

1. Improve current knowledge and awareness of habitats and natural areas.

2. Protect the biological integrity of critical habitat areas.

3. Encourage habitat restoration.

4. Evaluate the effectiveness of environmental mitigations.

Strategy #2: Protect the Biological Integrity of Critical Habitat Areas

C-RC 31 Areas of habitat richest in biodiversity and necessary for preserving threatened or endangered species should be formally designated to receive greatest priority for preservation, including baylands and riparian areas, serpentine areas, and other habitat types of major significance.

Strategy #3: Encourage Habitat Restoration

C-RC 34 Restoration of habitats should be encouraged and utilized where feasible, especially in cases where habitat preservation and flood control, water quality, or other objectives can be successfully combined.

Strategy #4: Evaluate Effectiveness of Environmental Mitigations

C-RC 36 Specific project mitigations for the purpose of preserving habitat should be monitored for a period of time to assure the likelihood of their effectiveness.

Scenic Resources

C-RC 57 The scenic and aesthetic qualities of both the natural and built environments should be preserved and enhanced for their importance to the overall quality of life for Santa Clara County.

C-RC 58 The general approach to scenic resource preservation on a countywide basis should include the following strategy:

c. maintaining and enhancing scenic urban settings, such as parks and open space, civic places, and major public commons areas.

Strategy #2: Minimize Development Impacts on Significant Scenic Resources

C-RC 61 Public and private development and infrastructure located in areas of special scenic significance should not create major, lasting adverse visual impacts.

Strategy #3: Maintain and Enhance the Scenic Values of Urban Settings

C-RC 62 Urban parks and open spaces, civic places, and public commons areas should be designed, developed and maintained such that the aesthetic qualities of urban settings are preserved and urban livability is enhanced. Natural resource features and functions within the urban environment should also be enhanced.

Solids Waste Management

C-RC 64 Countywide solid waste management efforts shall be guided by the hierarchy of strategies outlined below, emphasizing resource recovery in accordance with state law:

a. Source reduction and reuse,

b. Recycling and composting,

c. Transformation, and

d. Landfilling as final option.

Health and Safety Chapter

Hazardous Materials

Strategy #1: Manage Hazardous Materials Safely and Efficiently

C-HS 14 All feasible measures to safely and effectively manage hazardous materials and site hazardous materials treatment facilities should be used, including complying with all federal and state mandates.

Emergency Preparedness

Strategy #1: Plan for Immediate Disaster Response

C-HS 19 The County and cities should comply with federal and state hazardous materials regulations and planning activities, including, the Countywide Hazardous Waste Management Plan, the Hazardous Materials Area Plan, and the Operations Section of the County Emergency Plan regarding a hazardous materials incident.

Natural Hazards

Strategy #4: Reduce the Magnitude of the Hazard, If Feasible

C-HS 34 Flood control measures should be considered part of an overall community improvement program and advance the following goals, in addition to flood control:

a. resource conservation;

b. preservation of riparian vegetation and habitat;

c. recreation; and

d. scenic preservation of the County's streams and creeks

The Rural Unincorporated Areas Chapter of the County's General Plan – Book B (County of Santa Clara 1994) provides policies to preserve resources in the rural unincorporated areas of the county. Policies to preserves these resources that would be relevant to the Proposed Project include:

Parks and Recreation Chapter

Parks and Public Open Space Lands

Strategy #1: Develop Parks and Public Open Space Lands

NR-PR 5 Water resource facilities, utility corridors, abandoned railroad tracks, and reclaimed solid waste disposal sites should be used for compatible recreational uses, where feasible.

Strategy #4: Adequately Operate and Maintain Trails

R-PR 32 Trails shall be temporarily closed when conditions become unsafe or environmental resources are severely impacted. Such conditions could include soil erosion, flooding, fire hazard, environmental damage, or failure to follow the specific trail management plan (see Countywide Trails Master Plan - Design and Management Guidelines).

Resource Conservation Chapter

Water Supply, Quality, & Watershed Management

Strategy #2: Reduce Water Quality Impacts of Rural Land Use and Development

R-RC 11 Areas with prime percolation capabilities shall be protected to the maximum extent possible, and placement of significant pollution sources within such areas shall be avoided.

R-RC 14 Use and disposal of agricultural chemicals, such as fertilizers, pesticides and herbicides, shall be managed to minimize the threat of water pollution.

Habitat & Biodiversity

Strategy #1: Improve Current Knowledge and Awareness of Habitats and Natural Areas

R-RC 19 Habitat types and biodiversity within Santa Clara County and the region should be maintained and enhanced for their ecological, functional, aesthetic, educational, medicinal, and recreational importance.

Strategy #2: Protect the Biological Integrity of Critical Habitat Areas

R-RC 25 Wetlands habitats of San Francisco Bay shall be preserved and enhanced.

R-RC 31 Natural streams, riparian areas, and freshwater marshes shall be left in their natural state providing for percolation and water quality, fisheries, wildlife habitat, aesthetic relief, and educational or recreational uses that are environmentally compatible. Streams which may still provide spawning areas for anadromous fish species should be protected from pollution and development impacts which would degrade the quality of the stream environment.

R-RC 32 Riparian and freshwater habitats shall be protected through the following general means:

b. regulation of tree and vegetation removal;

c. reducing or eliminating use of herbicides, pesticides, and fertilizers by public agencies;

e. protection of endemic, native vegetation.

R-RC 35 Flood control modifications to be made in streams that have substantial existing natural areas should employ flood control designs which enhance riparian resources and avoid to the maximum extent possible significant alteration of the stream, its hydrology, and its environs.

R-RC 37 Lands near creeks, streams, and freshwater marshes shall be considered to be in a protected buffer area, consisting of the following:

1. 150 feet from the top bank on both sides where the creek or stream is predominantly in its natural state;

2. 100 feet from the top bank on both sides of the waterway where the creek or stream has had major alterations; and

3. In the case that neither (1) nor (2) are applicable, an area sufficient to protect the stream environment from adverse impacts of adjacent development, including impacts upon habitat, from sedimentation, biochemical, thermal and aesthetic impacts.

R-RC 38 Within the aforementioned buffer areas, the following restrictions and requirements shall apply to public projects, residential subdivisions, and other private non-residential development:

a. No building, structure or parking lots are allowed, exceptions being those minor structures required as part of flood control projects.

b. No despoiling or polluting actions shall be allowed, including grubbing, clearing, unrestricted grazing, tree cutting, grading, or debris or organic waste disposal, except for actions such as those necessary for fire suppression, maintenance of flood control channels, or removal of dead or diseased vegetation, so long as it will not adversely impact habitat value.

c. Endangered plant and animal species shall be protected within the area.

Strategy #3: Encourage Habitat Restoration Wherever Possible

R-RC 53 Restoration of habitats should be encouraged and utilized wherever feasible, especially in cases where habitat preservation and flood control, water quality, or other objectives can be successfully combined.

R-RC 54 Restoration of stream channels and riparian areas should be encouraged wherever feasible. Multiple uses, such as for recreational trails, should be considered so long as habitat and other ecological values are preserved.

Scenic Resources

R-RC 95 The scenic and aesthetic qualities of both the natural and built environments should be preserved and enhanced for their importance to the overall quality of life for Santa Clara County.

R-RC 97 Scenic qualities of the rural areas of Santa Clara County shall be maintained and enhanced through existing land use and development policies. Development compatible with scenic resource conservation should be encouraged.

R-RC 98 Hillsides, ridgelines, scenic transportation corridors, major county entryways, stream environments, and other areas designated as being of special scenic significance should receive utmost consideration and protection due to their prominence, visibility, and overall contribution to the quality of life in Santa Clara County.

Health and Safety Chapter

Geologic and Seismic Hazards

R-HS 19 In areas of high potential for activation of landslides, there shall be no avoidable alteration of the land or hydrology which is likely to increase the hazard potential, including:

a. saturation due to drainage or septic systems;
b. removal of vegetative cover; and
c. steepening of slopes or undercutting the base of a slope.

Land Use Policies Chapter

Resource Conservation Areas

R-LU 3 The general intent of each 'Resource Conservation Area' designation is to encourage land uses and densities appropriate to the rural unincorporated areas that also:

a. help preserve rural character;

b. conserve natural, scenic, and cultural resources;

c. protect public health and safety from natural and man-made hazards;

d. preserve agriculture and prime agricultural soils;

e. protect watersheds and water quality;

f. enhance air quality; and

g. minimize the demand for and cost of public services and facilities.

R-LU 5 The edges of the San Francisco Bay shall be preserved and restored as open space. Allowable uses shall include:

a. bay waters and sloughs;

b. marshes, wetlands and wetlands restoration;

c. salt extraction;

d. wildlife habitat;

e. open space preserves;

f. small piers and walkways;

g. wildlife observation; and

h. recreational uses, such as walking, horseback riding, bicycling, fishing, boating, education, swimming, limited hunting, aquaculture, and marinas.

R-LU 125 In vicinity of Llagas Creek, particularly in the areas of highly permeable soils, commercial uses should be situated and designed to prevent any form of harmful waste discharge in the creek. The value of the riparian habitat and the beauty of the creek should be maintained and enhanced.

South County Joint Area Plan (1994)

The South County Joint Area Plan – Book B (County of Santa Clara 1994) provides policies to preserve resources in the southern portion of the county. Policies to preserves these resources that would be relevant to the SMP Update include:

SC 12.9 Careful consideration should be given to the cumulative effects of development which would drain into the upper reaches of Llagas Creek and other creeks in order to avoid the need for channelization and consequent destruction of its riparian vegetation and natural habitat.

SC 13.1 Since County maintenance is limited to maintaining local storm drainage facilities which may affect County roads, any additional storm drain-related maintenance beyond that which is currently provided will require additional funding from residents and/or developers.

SC 15.8 Natural streamside and riparian areas should be left in their natural state, in order to preserve their value as percolation and recharge areas, natural habitat, scenic resources, recreation corridors and for bank stabilization. If flood control projects needed to protect presently existing development make this infeasible, disruption should be minimized, maintaining slow flow and stable banks through design and other appropriate mitigation measures.

SC 15.9 Wildlife, rare and endangered plants and animals, and heritage resources should be identified and protected from loss and destruction.

City of Campbell (2001)

Open Space, Parks, and Public Facilities Element:

Strategy OSP-1.1a: Santa Clara County Parks and Trails: Work with Santa Clara County and the Santa Clara Valley Water District to renovate and improve access to the Los Gatos Creek Trail and Los Gatos County Park

Strategy OSP-1.1b: Santa Clara Valley Water District: Work with the Santa Clara Valley Water District to provide public access and improvements to the Groundwater Recharge Facilities in the City and explore the possibility of a multiple-use recreational trail along San Tomas Aquino Creek.

Policy OSP-1.3: Facilities Improvement, Maintenance and Use Agreements with Regional Agencies: Utilize a variety of techniques to increase, preserve or maintain regional open space facilities such as facilities improvement, joint maintenance or use agreements.

Strategy OSP-1.3a: Facilities Improvement, Maintenance and Use Agreements: Enter into facilities improvement, maintenance and use agreements with the County of Santa Clara, the Santa Clara Valley Water District and other public agencies to improve, maintain and increase access to these open space, park lands and facilities.

Goal OSP-2: Provide and maintain attractive, safe, clean and comfortable open space, park land and recreational facilities and programs for maximum community use, benefit and enjoyment.

Policy OSP-9.1: Drainage Facilities: Ensure that drainage facilities convey storm runoff without polluting local watercourses.

Strategy OSP-9.1b: Regional Storm Drainage Facilities: Cooperate with surrounding jurisdictions and Santa Clara County to provide adequate regional storm drainage facilities.

Strategy OSP-9.1c: Urban Runoff Management Plan: Implement Urban Runoff Management Plan standards and programs to ensure to the maximum extent practicable that receiving waters and ground water recharge basins are not polluted.

Strategy OSP-9.1d: New Construction: Require new construction to utilize site preparation, grading and foundation designs that provide erosion control to prevent sedimentation and contamination of streams.

Strategy OSP-9.1e: Post-construction Pollution Control Measures: Require new construction projects to include post-construction pollution control measures in site designs to prevent pollution.

Conservation and Natural Resources Element:

Strategy CNR-1.1b: Archaeological Resources: In accordance with CEQA and the State Public Resources Code, require the discontinuation of all work in the immediate vicinity and the preparation of a resource mitigation plan and monitoring program by a licensed archaeologist if archaeological resources are found on any sites within the City.

Goal CNR-3: Protect and maintain animal and plant species and supporting habitats within Campbell.

Policy CNR-3.1: Riparian Corridor Preservation: Preserve the aesthetic and habitat value of riparian corridors.

Strategy CNR-3.1b: Santa Clara Valley Water District Activities: Work with Santa Clara Valley Water District to restrict future fencing, piping and channelization of creeks when flood control and public safety can be achieved through measures that preserve the natural environmental and habitat of riparian corridors.

Strategy CNR-3.1c: Native Species Planting: Encourage the Santa Clara Valley Water District, County Parks Department, City, developers and private property owners to plant and maintain native trees and plants and replace invasive, non-native species with native ones along creek corridors.

Strategy CNR-3.1d: Removal of Invasive Species: Institute an on-going program to remove invasive plant species and harmful insects from ecologically sensitive areas, primarily by means other than application of herbicides and pesticides.

Strategy CNR-3.1e: Concrete-lined Channels: Coordinate efforts with the Water District to revert some existing concrete-lined channels to more natural alternatives such as levees.

Strategy CNR-3.1f: Grading Ordinance: Develop and implement a Grading Ordinance that requires the use of erosion and sediment control measures and minimizes grading and vegetation removal near creeks to ensure that the creeks are protected from reduction in bank stability, erosion, downstream sedimentation and flooding.

Strategy CNR-5.1d: Sediment Removal from Creeks: Work with Santa Clara Valley Water District on sediment management for the creeks.

Strategy CNR-5.1e: Dumping into Waterways: Work with the Santa Clara Valley Water District to protect surface water quality by prohibiting the dumping of toxic chemical substances, debris and refuse in and near water ways and storm drains and adding signs with this information near these areas.

Strategy CNR-11.2d: Construction Dust Control: Require dust control measures, including those included in the Santa Clara Valley Non-point Pollution Control Program, during construction.

Strategy CNR-11.3b: Environmental Documents: Assess the adequacy of environmental documents for projects proposed in the City utilizing the thresholds established in the BAAQMD guidelines.

City of Cupertino (2005)

Cultural Resources Element

Policy 2-63 *Archaeologically Sensitive Areas. Protect archaeologically sensitive areas.*

Strategy Development Investigation. Require an investigation for development proposed in areas likely to be archaeologically sensitive, such as along stream courses and in oak groves, to determine if significant archaeological resources may be affected by the project. Also require appropriate mitigation measures in the project design.

Policy 2-64 *Native American Burials. Protect Native American burial sites.*

Strategy Upon discovery of such burials during construction, take action prescribed by State law, including stoppage of work in surrounding area, notification of appropriate authorities and reburial of remains in an appropriate manner.

Policy 2-65 *Heritage Trees. Protect and maintain heritage trees in a healthy state.*

Strategy Heritage Tree List. Establish and periodically revise a heritage tree list that includes trees of importance to the community.

Environmental Resources/Sustainability Element

Policy 5-4: Air Pollution Effects of New Development. Minimize the air quality impacts of new development projects and the impacts affecting new development.

Strategies:

1. Toxic Air Contaminants. Review projects for potential generation of toxic air contaminants at the time of approval and confer with BAAQMD on controls needed if impacts are uncertain.
2. Dust Control. Require water application to non-polluting dust control measures during demolition and the duration of the construction period.
3. Planning Decisions. Assess the potential for air pollution effects of future land use and transportation planning, and ensure that planning decisions support regional goals of improving air quality.
4. Environmental Review. Evaluate the relationship of sensitive receptors, such as convalescent hospitals and residential uses, to pollution sources through the environmental assessment of new development.

Policy 5-19: Natural Water Bodies and Drainage Systems. Require that site design respect the natural topography and drainages to the extent practicable to reduce the amount of grading necessary and limit disturbance to natural water bodies and natural drainage systems caused by development including roads, highways, and bridges.

Policy 5-27: Natural Water Courses. Retain and restore creek beds, riparian corridors, watercourses and associated vegetation in their natural state to protect wildlife habitat and recreation potential and assist groundwater percolation. Encourage land acquisition or dedication of such areas.

Strategy: Work with the Santa Clara Valley Water District and other relevant regional agencies to enhance riparian corridors and provide adequate flood control by use of flow increase mitigation measures.

Policy 5-32: Urban Runoff Pollution Prevention Program. Support and participate in the Santa Clara Valley Urban Runoff Pollution Prevention Program (SCVURPPP) in order to work cooperatively with other cities to improve the quality of storm water runoff discharge into San Francisco Bay.

Policy 5-33: Illicit Discharge into Storm Drains and Waterways. Prohibit the discharge of pollutants and the illicit dumping of wastes into the storm drains, creeks and waterways.

Policy 5-34: Storm Water Runoff. Encourage the reduction of impervious surface areas and investigate opportunities to retain or detain storm runoff on new development.

Health and Safety Element

Policy 6-47: Dwellings in Natural Flood Plain. Regulate closely all types of habitable development in natural flood plains. This includes prohibiting fill materials and obstructions that may increase flood potential downstream or modify the natural riparian corridors.

Policy 6-48: Hillside Grading. Restrict the extent and timing of hillside grading operation to April through October. Require performance bonds during the remaining time to guarantee the repair of any erosion damage. All graded slopes must be planted as soon as practical after grading is complete.

Policy 6-28: Hazardous Materials Storage and Disposal. Require the proper storage and disposal of hazardous materials to prevent leakage, potential explosions, fire or the release of harmful fumes.

City of Gilroy (2002)

Preservation

Goal: *A strong sense of connection to Gilroy's past through historical, archeological, and paleontological resources that are preserved, protected, enhanced, and commemorated for the benefit of current and future generations.*

Policy 5.01 Historic Preservation. Encourage public and private efforts for the preservation of historic and architecturally significant buildings, archeological sites, and other landmarks that give residents a tie with the past.

Policy 5.07 Archeological Resources. If archeological resources or human remains are discovered during construction, work shall be halted within 50 meters (150 feet) of the find until it can be evaluated by a qualified professional archeologist. If the find is determined to be significant, appropriate mitigation measures shall be formulated and implemented.

Action 5.I Archeological Assessments. Require an archeological assessment for all CEQA projects (i.e., projects requiring an environmental assessment) in potentially sensitive archeological areas (as indicated on the City's Historic and Cultural Resources Map). The assessment shall consist of a preliminary survey and, if evidence of sites is found, a test-level investigation.

Cultural Resources Mitigation Measure

MM 4.14-A In areas identified as archaeologically sensitive: A comprehensive cultural resource evaluation would be required at the time specific development projects are proposed. Unsurveyed areas would require a thorough field inspection to identify potential historic and prehistoric resources. After specific cultural surveys have been conducted, appropriate plans for evaluation and mitigation of impacted resources would be completed as necessary. The City shall exercise discretion in requiring project applicants to perform one or all of the following:

- Planning construction to avoid archaeological sites.
- "Capping" or covering the archaeological site with a layer of soil prior to construction. Capping may be used where serious soil compaction will not occur; the covering materials are not chemically active; and the site has been recorded.
- Deeding the archaeological sites into permanent conservation easements.

Community Design and Development Element

Policy 5.07 Archeological Resources. If archeological resources or human remains are discovered during construction, work shall be halted within 50 meters (150 feet) of the find until it can be evaluated by a qualified professional archeologist. If the find is determined to be significant, appropriate mitigation measures shall be formulated and implemented.

GOAL: Designation of Hecker Pass Highway, Santa Teresa Boulevard, and Pacheco Pass Highway as scenic highways, and long-term protection of their scenic qualities.

Policy 6.01 Scenic Highways. Support the designation of Hecker Pass Highway, Santa Teresa Boulevard, and Pacheco Pass Highway as official State Scenic Highways, and establish appropriate development controls to ensure long-term protection of their scenic qualities. Controls should establish appropriate setbacks, sign controls, and other development regulations in keeping with State guidelines for the protection of scenic highway corridors.

Policy 6.02 Other Scenic Roadways. Recognize and protect important scenic qualities and natural features on other roadways in the Planning Area, including Uvas Park Drive and Miller Avenue from First Street to Mesa Road.

Community Resources and Potential Hazards Element

GOAL: Preservation, protection, and maintenance of Gilroy's natural open space resources (including creeks, meadows, hills, woodlands, and vistas) for their watershed protection, habitat preservation, recreation, and aesthetic value, ensuring that they retain their natural qualities and beauty in perpetuity.

Policy 20.01 Open Space Areas. Preserve and protect the following open space areas:

a) Natural resource and wildlife habitat areas, such as the Uvas Creek and Llagas Creek riparian communities; the heavily vegetated portions of the Santa Cruz mountains; steep hillsides and significant hillside features (such as serpentinite barrens); and natural features of high community value (e.g., the stands of trees along Miller Avenue and cedar trees bordering Hecker Pass).

b) Hazardous areas, such as fault zones, areas subject to strong groundshaking during earthquakes, and floodways.

c) Lands around reservoirs.

d) Lands which provide greenbelts for the South County cities.

e) Recreational lands, including community, neighborhood, and linear parks; expanded linear parks along Uvas and Llagas Creek; and the Gilroy Municipal Golf Course.

Policy 20.02 Creek Protection. Protect the ecological, aesthetic and recreational value of the creeks that flow through the Gilroy Planning Area from urban encroachment and degradation. Ensure that new development preserves the function of natural drainages, including small canyons and seasonal creeks. The easements and setbacks adjacent to these creeks shall be maintained in open space. Access to creeks should be of sufficient width to accommodate trails, flood control access, and protection of riparian habitat.

Policy 20.03 Plant and Wildlife Habitats. Preserve important plant and wildlife habitats, including riparian communities, heavily vegetated hillside areas, unique hillside ecosystems (e.g., serpentinite barrens), creeks, and sensitive nesting sites. Loss of these habitats should be fully offset through creation of habitat of equal value, with the compensation rate for habitat creation determined by a qualified biologist.

Policy 20.04 Rare and Endangered Species. Limit development in areas that support the California Tiger Salamander and other rare or endangered species. If development of these areas must occur, any loss of habitat should be fully compensated onsite. If off-site mitigation is necessary, it should occur within the Gilroy Planning Area whenever possible, and must be accompanied by plans and a monitoring program prepared by a qualified biologist.

Policy 20.05 Greenbelts. Designate protected open space areas in conjunction with agricultural lands to create significant natural buffers, or "greenbelts," between Gilroy and surrounding communities, helping to retain the city's semi-rural, small town quality. Land uses within a greenbelt should be determined by joint planning activities of the South County cities and the County, but might include very low density residential development; public parks and recreation areas; privately operated recreation areas; and agriculture. Of special concern is the area separating the northern part of the Gilroy Planning Area from the community of San Martin. If an adequate greenbelt cannot be established in the area north of Masten and Fitzgerald Roads, then the Gilroy General Plan Land Use Map should be amended to include a greenbelt strip in the northern part of the Planning Area.

Policy 20.06 Open Space Access and Management. Manage and maintain public open space areas and encourage the management and maintenance of private open space areas in a manner that ensures habitat protection, provides for public access, addresses public safety concerns, and meets low-impact recreation needs.

Policy 21.02 Landscaping to Reduce Pollutants. Promote the use of trees and plants in landscaping to reduce air pollutant levels.

GOAL: Protection of groundwater in the Llagas subbasin from contamination and a clean and healthy supply of potable water in compliance with State and Federal water quality standards.

Policy 22.01 Inter-Agency Coordination. Maintain close coordination with the agencies and organizations that share jurisdiction and interest relative to South County's water supply and water quality, including: the Regional Water Quality Control Board; Santa Clara Valley Water District; County Health Department; County Executive's Office; County Planning Office; Morgan Hill Planning Department; and the San Martin Planning Committee.

Policy 22.02 Compatible Ordinances, Standards, and Enforcement Procedures. Ensure compatible ordinances, standards, and enforcement procedures regarding water quality in all South County jurisdictions so that there is no advantage for a company to locate in an area with lower standards. Also, encourage the two Regional Water Quality Control Boards that have jurisdiction in South County to agree on compatible water quality standards for South County and consistent approaches to implementing the State Board's non-degradation policy.

Policy 22.03 Land Use Controls. Prohibit development of waste facilities, septic systems, and industries using toxic chemicals in areas where polluting substances may come in contact with groundwater, floodwaters, creeks, or reservoir waters. Within the Gilroy Planning Area, identify land uses that may contribute to the degradation of groundwater quality and ensure adequate monitoring, controls and enforcement to protect groundwater quality.

Policy 25.17 Flood Control Coordination. Work closely with the Santa Clara Valley Water District to alleviate flooding and drainage problems in the Planning Area, ensuring that new flood control measures are designed and implemented in accordance "Best Management Practices (BMPs) and in keeping with the goals and policies of the General Plan.

Policy 25.19 Floodway Use. Discourage the construction of expensive flood prevention facilities by leaving high-risk floodways in agricultural and recreational uses.

Policy 25.20 Flood Control Costs and Impacts. Minimize the long-term public costs of flood control improvements and mitigate potential adverse environmental impacts. Also ensure that measures to reduce flood damage to individual properties do not increase erosion and/or flood hazards on other properties.

Policy 25.21 Multiple Use of Flood Control Projects. Design flood control measures and drainage channel improvements as part of an overall community improvement program with provision for multiple use, including recreational open space, trails, bikeways, groundwater recharge, protection and restoration of riparian vegetation and wildlife habitats, and enhancement of scenic qualities.

Policy 25.22 Drainage Channel Design. Design new drainage channels with gently sloping and curving banks to maximize safety, ease of maintenance, and natural appearance. To the greatest extent feasible, use riparian vegetation to stabilize the banks and to landscape the channels in a manner that is natural in character and easy to maintain, creating a scenic asset for the enjoyment of City residents.

Policy 25.23 Green Areas and Permeable Surfaces for Runoff Reduction and Absorption. Require new development to include green areas for reducing runoff and increasing runoff absorption capacities. Similarly, encourage the removal of pavement that is not directly serve traffic parking needs; maintain unpaved parkways between sidewalks and streets; encourage the use of permeable paving materials; and require the use of landscaped strips and islands to break-up large paved areas.

Policy 25.24 Flood Control Issues in Hillside Areas. Require new developments in hillside areas to retain and protect areas of native vegetation to help reduce erosion and slow the speed of rainfall runoff, thereby retaining the hillside areas' natural flood control characteristics. Ensure that retention and protection of vegetated areas is also in keeping with fire hazard management goals.

Policy 27.01 Hazardous Materials Inspections and Monitoring. Continue to provide inspections and monitoring to ensure compliance with local, state, and federal regulations and to reduce the risks associated with the use and handling of hazardous materials and wastes.

Policy 27.02 Hazardous Waste Reduction. Minimize the potential hazards posed by the storage and transport of hazardous materials and waste by encouraging source reduction, waste minimization, and on-site pretreatment.

Policy 27.04 Potential Hazardous Soils Conditions. Evaluate new development on sites that may have involved hazardous materials, to ensure there is no public health danger prior to granting development approvals.

City of Los Altos (2002)

Cultural Resources Element

Goal 6 *Preserve and enhance selected historic and cultural structures and resources within the community.*

Policy 6.4 Preserve archaeological artifacts and sites found in Los Altos or mitigate disturbances to them, consistent with their intrinsic value.

Policy 6.5 Require an archaeological survey prior to the approval of significant development projects near creeksides or identified archaeological sites.

Implementation Strategies

CDHR 13 Protect Significant Archaeological Resources. Assess development proposals for potential impacts to significant archaeological resources pursuant to Section 15064.5 of the CEQA Guidelines. Require a study conducted by a professional archaeologist for projects located near creeks or identified archaeological sites to determine if significant archaeological resources are potentially present and if the project will significantly impact the resources. If significant impacts are identified, either require the project to be modified to avoid the impacts, or require measures to mitigate the impacts. Mitigation may involve archeological investigation or recovery.

Open Space, Conservation & Community Facilities Element

Goal 2: Preserve and protect and provide for public enjoyment of natural areas (natural creek channels, topography, and vegetation), which are valuable natural resources.

Policy 2.3: Protect creeks, creekside areas and riparian habitat in their natural state while ensuring public safety and preserving a valuable natural resource.

Policy 2.4: Take an active role in promoting the adoption of a regional stream management plan.

Policy 2.5: Enforce local, state, and federal regulations addressing water quality and stormwater quality management.

Policy 2.6: Adopt land use controls that prevent incompatible uses for parcels adjacent to existing open space lands and recreation areas.

Policy 2.7: Establish buffers from adjoining land uses to protect the natural state of all creekside areas.

Policy 2.8: Encourage access and improvements along the creeks on public property.

Natural Environment and Hazards Element

Goal 2: Reduce the potential for flooding along creeks that traverse Los Altos.

Policy 2.1: Work with other jurisdictions to regulate land uses in flood-prone areas and allow development in those areas only with appropriate mitigation.

Policy 2.2: Identify and seek sources of funding to be used toward the prevention of flooding.

Policy 2.3: Continue to discourage concrete lining of creek beds, and encourage the Santa Clara Valley Water District to use environmentally sensitive solutions to control local erosion problems.

Goal 3: Protect the community's health, safety, welfare, natural resources, and property through regulation of use, storage, transport, and disposal of hazardous materials.

Policy 3.1: Cooperate with and participate in development of the policies and future programs of the Santa Clara County Health Department and the California Legislature.

Policy 3.2: Support the management of hazardous materials contamination and abatement by public and private agencies.

Infrastructure & Waste Disposal Element

Goal 3: Abate non-point source water pollution.

Policy 3.1: Control surface runoff water discharges into the storm water system to comply with the National Pollutant Discharge Elimination System Permit and the receiving water limitations assigned by the California Regional Water Quality Control Board.

Policy 3.2: Establish non-point source pollution control measures and programs to attempt to reduce and control the discharge of pollutants into the City's storm drains and local creeks.

Policy 3.5: Preserve, and where possible, create or restore areas that provide important water quality benefits, such as riparian corridors, wetlands, and buffer zones.

Policy 3.6: Limit disturbances of natural water bodies and natural drainage systems caused by development including roads, highways, and bridges.

Policy 3.7: Avoid development of areas that are particularly susceptible to erosion and sediment loss; or establish development guidance that identifies these areas and protects them from erosion and sediment loss.

The City of Los Altos has established a Watercourse Protection Ordinance to protect its watercourses by requiring the maintenance of waterways to keep them free of debris,

excessive vegetation and other obstacles that have the potential to pollute, contaminate, or significantly retard water flow.

Los Altos also implements a tree removal permit program to retain as many trees within the city as possible. Trees that require a permit before being removed include:

- All trees with a circumference of 48 inches or greater measured at 48 inches above the ground.
- Any tree located within the public right-of-way.
- Any Canary Island Palm trees located on Rinconada Court. The Historical Commission has designated these particular trees as landmark trees.
- Any tree which was required to be saved or planted in conjunction with a development review application.

Town of Los Altos Hills (2007)

Cultural Resources Element

GOAL 10 *Encourage both public and private efforts to preserve and enhance historic resources.*

Policy 10.1 Preserve, protect and enhance the historic resources of the planning area because they are unique and valuable assets for the community and region.

Conservation Element

GOAL 1: Conserve creeks and riparian areas as open space amenities and natural habitat areas.

Policy 1.1 Avoid fencing, piping, and channelization of creeks when flood control and public safety can be achieved through measures that preserve the natural environment and habitat of the creek.

Policy 1.2 Work with the Santa Clara Valley Water District and other relevant regional agencies to enhance riparian corridors and provide adequate flood control by use of low impact restoration strategies.

Policy 1.3 Preserve the integrity of riparian corridors as unique and environmentally sensitive resources.

GOAL 2: Protect native and naturalized trees and plants.

Policy 2.1 Minimize disturbance of the natural terrain and vegetation.

Policy 2.2 Preserve and protect native and naturalized plants, with special attention to preservation of unique, rare or endangered species and plant communities such as oak woodlands.

Policy 2.3 Preserve and protect Heritage Trees, including native oaks and other significant trees, on public and private property.

Policy 2.4 Encourage the planting of native trees and shrubs to provide a substantial buffer between the roadways and adjoining properties in harmony with the general character of the Town.

Policy 2.5 Encourage the removal and prevention of the spreading of aggressive exotics such as Italian thistle, stinkweed, pampas grass, acacia, yellow star thistle, French broom, Scotch broom and eucalyptus.

Policy 2.6 Encourage the removal of poison oak where allowed by law.

Policy 2.7 Avoid the development of environmentally sensitive areas that are rich in wildlife or of a fragile ecological nature, such as areas of rare or endangered species of plants, or riparian areas.

GOAL 3: Maintain and enhance the integrity of wildlife habitat.

Policy 3.1 Maintain and protect creeks and riparian corridors for wildlife that use this resource for food, shelter, migration and breeding.

GOAL 5: Protect and conserve water resources.

Policy 5.1 Keep or restore major drainage courses in their natural condition insofar as possible because of their importance in supplying major vegetation, land forms and wildlife habitat, and storm drainage.

Policy 5.2 Protect the Town's groundwater from the adverse impacts of urban uses.

Policy 5.3 Encourage the conservation and efficient use of water in new and existing residences.

Policy 5.5 Reduce non-point source pollution in urban runoff.

GOAL 6: Protect and conserve soil resources.

Policy 6.1 Encourage soil stabilization measures that mitigate soil erosion and sedimentation.

Policy 6.2 Ensure the proper use, storage and disposal of toxic chemicals to prevent soil contamination.

Policy 6.3 Minimize the removal of vegetation and require replanting to maintain soil stability, prevent erosion, and retain the aesthetic quality of the community.

GOAL 11: Promote and enhance the integrity of the natural environment.

Policy 11.1 Develop and implement programs by which the natural environmental features of the planning area can be conserved to the maximum extent feasible and by which areas already unduly disturbed by man can be returned to a more natural condition.

Policy 11.2 Ensure that in the planning, development and use of land, environmental impact is not overlooked, conservation actions are considered, and such evaluations and actions are sufficiently comprehensive and consistent with established guidelines.

Policy 11.3 Conserve the natural character of the planning area in any land development project.

Policy 11.4 Ensure that the scale of building, the siting of development, the design and the materials of construction are harmonious with the natural setting.

Policy 11.5 Ensure that development projects are designed to conserve the natural slope, preserve existing native vegetation, limit invasive species, and conserve natural drainage channels and swales.

Policy 11.6 Participate in and support the conservation efforts of other jurisdictions, agencies or organizations that are of mutual benefit to the Town.

Policy 11.7 Support conservation education programs in the local schools and, when necessary to respond to local problems, initiate and implement specific educational programs or campaigns.

Safety Element

GOAL 1: Protect the public from risk of personal injury and property damage due to natural safety hazards.

Policy 1.2 Unstable terrain, active fault traces, water channels, flood plains, excessively steep slopes and other areas determined hazardous to public welfare and safety shall not be developed unless unobtrusive corrective measures can assure public safety. Minimize the risk of personal injury and property damage due to flooding.

Policy 3.1 Leave natural channels and flood plains in a natural state, unencumbered by development to the maximum extent feasible. Exceptions shall be made only in situations where it is essential to protect established property values or for public safety.

Open Space and Recreation Element

GOAL 1: Protect and preserve open space lands for future generations.

Policy 1.2 Protect and maintain those areas necessary to the integrity of natural resources and processes, with special emphasis on, but not limited to, the groundwater recharge and drainage system, open spaces vital for wildlife habitat, open spaces suitable for agriculture, and other areas of major or unique ecological significance.

Policy 1.3 Provide open space for outdoor recreational needs and for the preservation of sites of historical and cultural significance.

Policy 1.4 Preserve the natural beauty and minimize disturbance of the natural terrain and vegetation.

Policy 1.5 Preserve the important vistas, such as Monte Bello, Kaiser, Neary and Ewing Hill Ridges, and the hillsides leading to these ridges.

Policy 1.6 Preserve open space where necessary for the protection of public health and safety.

Policy 1.7 To the extent possible, link open spaces together visually and physically to form a system of open spaces.

Policy 1.8 Ensure that land uses and structures are compatible with the general open space quality of the planning area.

Policy 1.11 Encourage the use of Murietta Ridge Preserve as a conservation area, rather than a recreation area, in order to protect the existing vegetation and wildlife habitat.

Policy 1.12 Ensure that open space lands achieve the following objectives:

- Preserve visually and environmentally significant open space resources; and
- Provide for recreation activities compatible with the enjoyment and preservation of each site's natural resources, with pathway linkages to adjacent and nearby parks and open space preserves.

Town of Los Gatos (2010)

Cultural Resources Element

Goal OSP-8 To protect Los Gatos's archaeological and cultural resources to maintain and enhance a unique sense of place.

Policies

OSP-8.1 Evaluate archaeological and/or cultural resources early in the development review process through consultation with interested parties and the use of contemporary professional techniques in archaeology, ethnography and architectural history.

OSP-8.2 Ensure the preservation, restoration and appropriate use of archaeological and/or culturally significant structures and sites.

OSP-8.3 Treat with respect and dignity any human remains discovered during implementation of public and private projects within the Town and fully comply with California laws that address the identification and treatment of human remains.

OSP-8.4 Require that if cultural resources, including archaeological or paleontological resources, are uncovered during grading or other on-site excavation activities, construction shall stop until appropriate mitigation is implemented.

Actions

OSP-8.1 Develop guidelines for project review to ensure that potential impacts to archaeological and/or cultural resources are minimized.

Goal CD-12 To preserve significant historic and architectural features within the Town.

Policies

CD-12.7 All projects shall consider any adverse effect to historic landmarks and features on or in the vicinity of the proposed project.

CD-12.8 Require any development having potential adverse impacts on historical sites and/or features on or in the vicinity of the site to:

a. Accommodate the historical structure or feature; or

b. Mitigate potential adverse impacts to a level acceptable to the Town; or

c. Relocate the historical feature to an appropriate site.

Open Space Element

Goal O.G.1 .1: To acquire open space areas within the Town of Los Gatos, particularly lands which provide recreational uses and will protect the public health, welfare, and safety of residents and visitors (e.g.: lands in flood plains, watershed lands, or lands subject to fire or geologic hazards).

Policy O.P.1.5 Promote a system of Town parks and trails and maximize the use of public utility easements , flood control channels, school grounds, and other quasi-public areas for recreational uses and playfields.

Conservation Element

Goal C.G.2.2: To protect and preserve watersheds.

Goal C.G.2.3: To minimize the amount of storm water runoff, as well as to protect and improve the quality of runoff.

Goal C.G.2.5: To insure an adequate water supply for the Town's plant and animal wildlife as well as human populations.

Goal C.G.2 .6: To protect riparian corridors including intermittent and ephemeral streams.

Policy C.P.2.1 Apply land use regulations, scenic easements, or other appropriate measures to keep a maximum of the watershed and lands immediately contiguous to reservoirs and stream channels in an open, natural state.

Policy C.P.2.3 Consider the single and cumulative impacts on water drainage (runoff) and contamination (water quality) in the environmental review process of development in all areas but particularly in or adjacent to hillsides, riparian lands or important undeveloped watershed areas.

Policy C.P.2.4 Establish natural open space and recreation as the priority land use designation for lands immediately adjacent to reservoirs and streams.

Policy C.P.2.5 Delineate and adopt designated floodways for all major streams utilizing the full flood plain concept as a first priority and the modified flood plain concept as a second priority for flood plain development.

Policy C.P.2.7 Promote non-point source pollution control programs to reduce and control the discharge of non-point source pollutants into the storm drain system.

Policy C.P.2.9 Cooperate with the Santa Clara Valley Water District and their agencies to protect watersheds and riparian habitats from degradation.

Policy C.P.2.10 Retain creek beds, riparian corridors, water courses and associated vegetation in their natural state to assist groundwater percolation and prevent erosion and downstream sedimentation.

Goal C.G.3.1: To conserve the air resources of the Town.

Goal C.G.3.2: To maintain and improve acceptable air quality in Los Gatos.

Policy C.P.3.4 Encourage reduction of air pollution by encouraging the use of the Route 85 corridor for cross-town circulation.

Policy C.P.3.5 Pursue reduction of individual auto use by requiring a plan for alternatives to auto use whenever the traffic generated by any development would result in an adverse increase in air and noise pollution.

Policy C.P.3.7 Maintain street trees, plant additional street trees and encourage preservation and planting of trees on private property.

Goal C.G.4.1: To conserve and augment the plant life of the Town.

Goal C.G.4.2: To prevent damage to plant life in the hillsides, watershed and riparian areas.

Policy C.P.4.1 Use existing ordinances and enact any necessary others to preserve trees on public and private property.

Policy C.P.4.2 Preserve heritage trees and specimen.

Policy C.P.4.3 Preserve the habitat of species that are native, have special value to the Town or are threatened/endangered.

Policy C.P.4.4 Preserve riparian corridors.

Policy C.P.4.5 Preserve wetlands.

Policy C.P.4.6 Preserve nesting sites.

Policy C.P.4.7 Promote public and private projects that protect native plant species.

Policy C.P.4.8 Prevent development that significantly depletes, damages or alters existing plant life, wildlife habitat or landscape vistas.

Policy C.P.4.11 Encourage preservation and use of native plant species in hillside areas.

Goal C.G.5.1: To conserve the wildlife populations.

Policy C.P.5.1 Minimize, and where feasible, eliminate the use of herbicides and slowly bio-degrading pesticides to minimize potential damage to native plants, birds, and other wildlife.

Policy C.P.5.3 Maintain open space and native plant communities that provide habitat and migration corridors for native and viable introduced species.

Policy C.P.5.4 Establish sound land management practices that will improve wildlife habitats.

Policy C.P.5.5 Identify and protect areas where there is a high degree of diversity in the types of habitat available for wildlife.

Policy C.P.5.6 Promote the design of public and private projects that provide the maximum protection of wildlife populations.

Policy C.P.5.7 Limit public access in areas where significant wildlife populations exist.

Safety Element

Goal S.G.1.1: To reduce the potential for injuries, damage to property, economic and social displacement, and loss of life resulting from earthquakes, and other various forms of geologic failures including mud flows and landslides.

Goal S.G.1.2: To minimum exposure to geologic hazards, including slope instability, subsidence, and expansive soils, and to seismic hazards including groundshaking, fault rupture, liquefaction and landsliding.

Policy S.P.1.1 Ensure that reliable evaluations are made of the geologic conditions existing at all sites proposed for development, especially where conditions indicate the possibility of weak supporting s oils or geologic structures.

Goal S.G.3.1: To reduce the potential for injuries, damage to property, economic and social displacement, and loss of life resulting from flood hazards.

Policy S.P.3.1 Limit the intensity of land use in flood plain areas.

Policy S.P.3.2 Require site planning and building design to address identified flood and inundation hazards.

Policy S.P.3.3 Insure federal standards are met for development in designated flood plains along Los Gatos Creek and other creeks in the Planning Area.

Goal S.G.5.1: To reduce the potential for injuries, damage to property, economic and social displacement, and loss of life resulting from hazards related to hazardous materials.

Policy S.P.5.1 Work with public agencies and private organizations to prevent introduction of hazardous materials into the water and air supply.

City of Milpitas (2002)

Cultural Resources Element

Chapter 4 of Code City's Zoning, Planning and Annexation Code

XI-4-9.00 Permits. It is unlawful for any person to tear down, demolish, construct, alter, remove, or relocate any improvement, or any portion thereof, which has been designated a cultural resource or cultural resource site pursuant to the provisions of this Chapter, or which lies within an historic district so designated pursuant to the provisions of this Chapter, or to alter in any manner any exterior architectural feature of such a cultural resource, cultural resource site or improvement within such an historic district, or to place, erect, alter or relocate any sign within such an historic district or on such a cultural resource or cultural resource site, without first obtaining a permit to do so in the manner provided in this Chapter, nor shall the Building Department or Planning Commission grant any permit to carry out such work on a cultural resource or cultural resource site or within an historic district, except in conformity to the provisions of this Chapter.

Open Space & Environmental Conservation Element

Guiding Principle 4.a-G-2 Develop a diversified trail system along streamsides and other public rights of way to provide recreational opportunities and link facilities.

Guiding Principle 4.a-G-3 Cooperate with other agencies, such as the County and MUSD, to provide recreational opportunities to residents.

Implementing Policy 4.a-I-3 Provide a system of hiking and riding trails and pathways connecting the Valley Floor Area to Ed Levin Park.

Implementing Policy 4.a-I-4 Explore the feasibility of a trail in the Hillside Area within the crestline zone of protection connecting Ed Levin County Park to Alum Rock Park.

Implementing Policy 4.a-I-5 Provide an extensive visually stimulating system of "people paths" by developing park chains along Coyote River and the Hetch Hetchy right-of-way.

Implementing Policy 4.a-I-6 Develop the Coyote River area in cooperation with the County Park and Recreation Commission in a linear park chain which would connect with the Coyote Park Chain in San Jose and

	provide a safe mechanism for undertaking flood-control measures. The trails along Coyote Creek should be part of the San Francisco Bay Trail, a regional network of trails used by hikers and bicyclists.
Guiding Principle 4.b-G-1	Protect and conserve open spaces which are necessary for wildlife habitats and unique ecological patterns.
Guiding Principle 4.b-G-2	Preserve and protect populations and supporting habitat of special status species within the Planning Area, including species that are state or federally-listed as Rare, Threatened, or Endangered, all federal "candidate" species for listing and other species proposed for listing, and all California Species of Special Concern.
Implementing Policy 4.b-I-1	Strictly enforce grading regulations controlling removal of vegetative cover from hillside areas.
Implementing Policy 4.b-I-2	Preserve remaining stands of trees.
Implementing Policy 4.b-I-3	Recreation use of essentially virgin areas should be centered around activities which have a minimally disruptive effect on natural vegetation
Implementing Policy 4.b-I-4	Require a biological assessment of any project site where sensitive species are present, or where habitats that support known sensitive species are present.
Implementing Policy 4.b-I-5	Utilize sensitive species information acquired through biological assessments, project land use, planning and design.
Guiding Principle 4.d-G-1	Protect and enhance the quality of water resources in the Planning Area.
Guiding Principle 4.f-G-1	Preserve existing historical and cultural resources, especially those sites where an Historical Park may prove feasible.
Guiding Principle 4.g-G-1	Preserve and enhance the natural beauty of the Milpitas area.
Guiding Principle 4.g-G-2	Establish a network of continuous and varied Scenic Routes that provide views of Scenic Resources and access from urban areas and the regular transportation network to parks, open spaces and cultural attractions.
Guiding Principle 4.g-G-3	Enhance the visual impact of the gateways to Milpitas.
Guiding Principle 4.g-G-4	Encourage a variety of recreational uses along Scenic Routes consistent with the concept of protecting visual resources.
Guiding Principle 4.g-G-5	Provide for the inclusion of facilities and improvements (vista points, picnic areas, etc.) along Scenic Routes where appropriate.
Guiding Principle 4.g-G-6	Design and site Scenic Routes to have a minimal adverse impact on the environment.
Guiding Principle 4.g-G-7	Exempt all lands within the Valley Floor Planning Area from Scenic Corridor restrictions.
Implementing Policy 4.g-I-13	Develop the section of Berryessa Creek which runs through the Town Center into a scenic as well as a recreation resource for the Town Center.

Seismic and Safety Element

Guiding Principle 5.b-G-1	Minimize threat to life and property from flooding and dam inundation.
Implementing Policy 5.b-I-5	Seek construction of flood control channels to withstand 100-year floods along Coyote, Penitencia, Berryessa, Scott, Calera, and Los Coches creeks.

City of Monte Sereno (2008)

Cultural Resources Element

Goal OSC-9 Preserve cultural resources in Monte Sereno.

Policies

OSC-9.2 Continue to enforce the City's Historic Preservation Ordinance.

Open Space and Conservation Element

Goal OSC-4 Preserve and protect valuable biological resources.

Policy OSC-4.1	Preserve and rehabilitate natural habitat areas that support wildlife, particularly large contiguous areas of open space and riparian habitat along creeks.
Policy OSC-4.2	Preserve and protect rare, endangered and other sensitive species.
Policy OSC-4.4	Require mitigation of potential impacts to special status plant and animal species based on a policy of no-net-loss of habitat value. Mitigation measures shall incorporate, as the City deems appropriate, the guidelines and recommendations of the US Fish and Wildlife Service and the California Department of Fish and Game.
Policy OSC-4.5	To the extent possible, encourage the retention and reestablishment of native vegetation in all private development projects and public facility construction projects.
Policy OSC-4.6	Use native plants for landscaping of all public projects to the extent possible.

Goal OSC-5 Preserve and enhance the city's urban tree canopy.

Policy OSC-5.1	Continue to require that development proposals minimize the disturbance to or removal of existing trees to the extent possible.
Policy OSC-5.2	Require that removed trees be replaced with at least a one-to-one ratio, unless prohibited by good forestry practices
Policy OSC-5.3	Encourage the replacement of non-native trees with California native tree species.
Policy OSC-5.4	Continue to preserve and protect California native trees while recognizing the need to allow for the gradual replacement of trees to provide for on-going natural renewal.
Policy OSC-5.5	Continue to enforce the Tree Removal Ordinance and require development proposals to provide adequate information to City staff to assess the project's impact on existing trees.

Policy OSC-5.6 Continue to preserve the quality of trees in public and private open space areas.

Goal OSC-6 Maintain a high level of water quality.

Policy OSC-6.1 Encourage the preservation of riparian habitat in a natural state by not allowing the culverting of existing creeks and requiring appropriate setbacks from creekbeds.

Policy OSC-6.2 Require development projects to reduce, to the extent feasible, sediment discharge and erosion during construction and post-construction. Require projects to incorporate mitigation measures, such as Best Management Practices (BMPs) to address these water quality issues.

Policy OSC-6.3 Reduce surface run-off by minimizing impervious surfaces associated with motor vehicles, as well as requiring projects to include site designs that minimize impervious surfaces and maximize on-site filtration.

Policy OSC-6.4 Require property owners to work with the natural topography and drainage to the extent possible when designing development projects to reduce the amount of grading and limit disturbances to natural drainage systems.

Health and Safety Element

Goal HS-3 Minimize risk to lives, property and public liability due to landslides, soil erosion and flood.

Policy HS-3.4 Require re-vegetation where feasible to mitigate the appearance of engineered slopes and to control erosion contour grading.

Policy HS-3.5 Cooperate with County Flood Control to maintain a natural creek setting to the extent possible while providing for adequate drainage capacity.

Policy HS-3.6 Require, as appropriate, construction of storm drainage improvements prevent flooding during periods of heavy rainfall.

City of Morgan Hill (2001, updated through February 2010)

Cultural Resources Element

Goal 8. Preservation of the city's historic identity

Action 8.2 Identify and protect heritage resources from loss and destruction.

Community Development Element

Goal 18. Useful, accessible and high-quality park, recreation and trail facilities and programs

Policy 18k Encourage the development of trails along creeks and drainage channels, connecting parks, regional trails, schools, library, and other community facilities. 18l. Coordinate trails, parks, and recreation facilities with a citywide bikeways system to include bicycle paths, lanes and routes.

Policy 18u Trails and linear parkways along creeks and drainage ways shall be coordinated with development to ensure protection and restoration of natural resources.

Action 18.5 Work in partnership with the Santa Clara Valley Water District to establish easements and develop trails and linear parks along creeks and drainage channels.

Goal 21. Effective management of water resources

Policy 21a Manage the supply and use of water more efficiently through appropriate means, such as watershed protection, percolation, conservation and reclamation. (SCJAP 7.00)

Policy 21d Encourage the Santa Clara Valley Water District to continue developing programs to assure effective management of water resources, such as well monitoring, percolation of imported water, reclamation and conservation. (SCJAP 7.07)

Policy 21f Protect streambeds and other appropriate percolation areas from encroachment by urban development. (SCJAP 7.05)

Open Space and Conservation Element

Goal 5. Preservation and reclamation of streams and riparian areas as open space

Policy 5a Encourage reclamation of degraded streams and riparian areas.

Policy 5b Maintain riparian systems, stream banks and floodways in open space or related open space uses such as wildlife habitat, recreation or agriculture. (SCJAP 16.10)

Policy 5c A proposed streamside park along West Little Llagas Creek should be actively implemented and connected to the County trail system. (SCJAP 16.10 & 16.12)

Policy 5d Retain natural streamside and riparian areas in their natural state in order to preserve their value as percolation and recharge areas, natural habitat, scenic resources, recreation corridors and for bank stabilization. (SCJAP 15.08)

Policy 5e Where flood control projects are needed to protect existing development, minimize disruption of streams and riparian systems, maintaining slow flow and stable banks through design and other appropriate mitigation measures. (SCJAP 15.08)

Goal 6. Protection of native plants and animals Policies

Policy 6a Preserve all fish and wildlife habitats in their natural state whenever possible. Consider development impacts upon wildlife and utilize actions to mitigate those environmental impacts.

Policy 6b Minimize impacts upon wildlife when considering extending annexations, urban service areas, and other governmental actions that permit urban development of previously undeveloped property.

Policy 6c Preserve outstanding natural features, such as the skyline of a prominent hill, rock outcroppings, and native and/or historically significant trees.

Policy 6d Development shall be designed to conserve soil and avoid erosion. (SCJAP 13.06)

Policy 6e Identify and protect wildlife, rare and endangered plants and animals and heritage resources from loss and destruction. (SCJAP 15.09)

Policy 6f Access to creeks should be of sufficient width to accommodate trails, flood control access, and protection of riparian habitat. (SCJAP 16.11)

Policy 6g Encourage use of native plants, especially drought-resistant species, in landscaping to the extent possible.

Goal 4. The least possible damage to persons and property from flooding

Policy 4b Prohibit development in floodways and regulate in floodplains to minimize flood damage and be consistent with the federal flood insurance program and Santa Clara Valley Water District regulations. (SCJAP 15.05)

Policy 4e Natural streamside and riparian areas should be left in their natural state in order to preserve their value as percolation and recharge areas, natural habitat, scenic resources, recreation corridors and for bank stabilization. (SCJAP 15.08)

Policy 4f Minimize disruption of natural riparian areas by flood control projects needed to protect presently existing development by maintaining slow flow and stable banks through design and other appropriate mitigation measures. (SCJAP 15.08)

Policy 4p Require careful consideration of the cumulative effects of development which would drain into the upper reaches of Llagas Creek and other creeks, in order to avoid the need for channelization and consequent destruction of its riparian vegetation and natural habitat. (SCJAP 12.09)

Goal 5. Protection of water quality from contamination associated with urbanization

Policy 5a Protect water quality from contamination, and monitor it to assure that present policies and regulations are adequate. Prohibit such uses as waste facilities, septic systems and industries using toxic chemicals where polluting substances may come in contact with groundwater, floodwaters, and creeks or reservoir waters. (SCJAP 8.00)

Policy 5f Encourage enhancement of sensitive wetlands as part of future development.

Goal 6. Cooperative efforts to ensure regional water quality

Policy 6a Maintain close coordination with the following agencies and organizations which share jurisdiction and interest relative to South County's water supply and water quality: the Regional Water Quality Control Boards, Santa Clara Valley Water District, County Health Department, County Executive's Office, County Planning Office, Gilroy Planning Department, and San Martin Planning Committee. (SCJAP 10.02)

Policy 6b Encourage the two Regional Water Quality Control Boards which have jurisdiction in South County to agree upon compatible water quality standards and consistent approaches to implementing the State Board's non-degradation policy, so as not to confuse developers and jurisdictions which must carry out the Board's regulations. (SCJAP 10.01)

Policy 6e Where appropriate, the Regional Water Quality Boards, Cities, County and other local agencies should adopt compatible ordinances (i.e., HMSOs), standards (i.e., septic tank and alternative treatment and disposal methods), and enforcement procedures (i.e., implementing AB 2185, California Health and Safety Code Chapter 6.95, Division 20, Section 25500 et seq.) regarding water quality so that there is no advantage for a company to locate in an area with lower standards. (SCJAP 10.03)

Policy 6f Require the protection and/or replacement of essential habitat for rare, threatened, or endangered species and species of special concern as required by state and federal law.

Policy 6g Encourage the protection, restoration, and enhancement of remaining native grasslands, oak woodlands, marshlands and riparian habitat.

Policy 6h Preserve and protect mature, healthy trees whenever feasible, particularly native trees and other trees which are of significant size or of significant aesthetic value to immediate vicinity or to the community as a whole.

City of Mountain View (1992)

Community Development Chapter

Policy 8 Promote the visibility of and safe physical access to San Francisco Bay, the baylands, Stevens Creek, and other natural resources in the city.

Environmental Management and Community Development Chapter

Policy 3 Develop a system of urban trails in Mountain View

Policy 14 Improve and expand the city's urban forest

Policy 15 Encourage activities that maintain and improve drinking water quality

Policy 16 Establish pollution control measures that keep pollutants from entering Mountain View's storm drain system to protect the city's surface water resources

Policy 22 Encourage soil stabilization measures that prevent soil erosion and sedimentation

Policy 23 Ensure the proper use, storage, and disposal of toxic chemicals to prevent soil contamination

Policy 25 Protect and restore plant and wildlife habitats

Policy 26 Protect wildlife from the hazards of urbanization

Policy 32 Protect residents and their property from flood hazards

Policy 37 Prevent injuries and environmental contamination due to the uncontrolled release of hazardous materials

Goal J *Identify and preserve the city's archaeological resources*

Action 27.b Developed standard practices or contingency plans for preserving archaeological materials that are unearthed during construction.

City of Palo Alto (Comprehensive Plan 2007)

Cultural Resources Chapter

Policy L-51 Encourage public and private upkeep and preservation of resources that have historic merit, including residences listed in the Historic Inventory.

Policy L-60 Protect Palo Alto's archaeological resources. The Palo Alto area is known to have been inhabited by indigenous people for many centuries prior to the arrival of the first Europeans. Discoveries of the "Stanford Man" skeletons near San Francisquito Creek at Stanford indicate human presence as early as 7,600 years ago. Over 50 archaeological surveys have been conducted in Palo Alto in association with specific projects but no systematic citywide survey aimed at locating all sites has been undertaken. There may still be undiscovered archaeological resources in many parts of the City. Such resources are most likely to occur near the original locations of streams and springs and northeast of El Camino Real near old tidelands.

Program L-67 Using the archaeological sensitivity map in the Comprehensive Plan as a guide, continue to assess the need for archaeological surveys and mitigation plans on a project by project basis, consistent with the California Environmental Quality Act and the National Historic Preservation Act.

Natural Environment Chapter

Policy N-2: Support regional and sub-regional efforts to acquire, develop, operate, and maintain an open space system extending from Skyline Ridge to San Francisco Bay.

Policy N-3: Protect sensitive plant species resources from the impacts of development.

Policy N-4: Preserve the foothill area as predominantly open space.

Policy N-8: Preserve and protect the Bay, marshlands, salt ponds, sloughs, creeks, and other natural water or wetland areas as open space.

GOAL N-2: Conservation of Creeks and Riparian Areas as Open Space Amenities, Natural Habitat Areas, and Elements of Community Design.

Policy N-9: Avoid fencing, piping, and channelization of creeks when flood control and public safety can be achieved through measures that preserve the natural environment and habitat of the creek.

Policy N-10: Work with the Santa Clara Valley Water District and other relevant regional agencies to enhance riparian corridors and provide adequate flood control by use of low impact restoration strategies.

Policy N-11: Preserve the integrity of riparian corridors.

Policy N-12: Preserve the habitat value of creek corridors through the preservation of native plants and the replacement of invasive, non-native plants with native plants.

Policy N-13: Discourage creek bank instability, erosion, downstream sedimentation, and flooding by minimizing site disturbance and vegetation removal on or near creeks and carefully reviewing grading and drainage plans for development near creeks and elsewhere in the watersheds of creeks.

GOAL N-4: Water Resources that are Prudently Managed to Sustain Plant and Animal Life, Support Urban Activities, and Protect Public Health and Safety.

Policy N-18: Protect Palo Alto's groundwater from the adverse impacts of urban uses.

Policy N-21: Reduce non-point source pollution in urban runoff from residential, commercial, industrial, municipal, and transportation land uses and activities.

GOAL N-6: An Environment Free of the Damaging Effects of Biological and Chemical Hazardous Materials.

Policy N-30: Minimize the use of toxic and hazardous materials. Encourage the use of alternative materials and practices that are environmentally benign.

GOAL N-7: Reduced Volumes of Solid Waste; Solid Waste Disposed in an Environmentally Safe, Efficient, Manner.

Policy N-34: Reduce the amount of solid waste disposed in the City's landfill by reducing the amount of waste generated and promoting the cost-effective reuse of materials that would otherwise be placed in a landfill.

Policy N-35: Reduce solid waste generation through salvage and reuse of building materials, including architecturally and historically significant materials.

City of San Jose (2010)

Historic, Archaeological and Cultural Resources Goal:

Preservation of historically and archaeologically significant structures, sites, districts and artifacts in order to promote a greater sense of historic awareness and community identity and to enhance the quality of urban living.

Policy 1. Because historically or archaeologically significant sites, structures and districts are irreplaceable resources, their preservation should be a key consideration in the development review process.

Policy 2. The City should use the Area of Historic Sensitivity overlay and the landmark designation process of the Historical Preservation Ordinance to promote and enhance the preservation of historically or architecturally significant sites and structures.

Policy 9. Recognizing that Native American burials may be encountered at unexpected locations, the City should impose a requirement on all development permits and tentative subdivision maps that upon discovery of such burials during construction, development activity will cease until professional archaeological examination and reburial in an appropriate manner is accomplished.

Policy 10. Heritage trees should be maintained and protected in a healthy state. The heritage tree list, identifying trees of special significance to the community, should be periodically updated.

Services and Facilities – Storm Drainage and Flood Protection Policies:

13. In designing improvements to creeks and rivers, adjacent properties should be protected from flooding consistent with the best available information and standards from the Federal Emergency Management Agency (FEMA) and the California Department of Water Resources (DWR).

14. The "modified floodplain design" is the preferred design for future flood protection facilities. The "widen-one-bank" and "trapezoidal channel" designs should only be used when funding or right-of-way limitations make the use of the modified floodplain design impractical. Future development should consider factors such as flooding risks, proximity to waterways, and the potential for implementing flood protection measures.

15. The City should continue to cooperate with other public and private jurisdictions and agencies to coordinate emergency response and relief efforts in case of flooding.

16. The City should encourage the use of flood protection guidelines in development, such as those recommended by the SCVWD, FEMA, and DWR.

Aesthetic, Cultural, and Recreational Resources - Parks and Recreation Policies:

6. In the design and maintenance of parks, consideration should be given to impacts on wildlife. In particular, it should be recognized that native plant species may be best suited for providing wildlife cover and food sources and that herbicides, pesticides and fungicides may be damaging to native plants and wildlife.

7. The City encourages the Santa Clara Valley Water District, school districts, the Pacific Gas and Electric Company and other public agencies and utilities to provide for appropriate recreational uses of their respective properties and rights-of-way. Consideration should be given to cooperative efforts between these entities and the City to develop parks, pedestrian and bicycle trails, other open space areas, and recreational facilities and programs.

14. Bikeways, hiking trails, equestrian trails, rest areas and picnicking accommodations should be provided, wherever feasible, within parks and trails corridors designated on the Scenic Routes and Trails Diagram, to access the hillsides, ridgelines, baylands, significant waterways, and other scenic areas.

Scenic Routes Policies:

2. The natural character of Rural Scenic Corridors should be preserved by incorporating mature stands of trees, rock outcroppings, streams, lakes and reservoirs and other such natural features into project designs.

Natural Resources – Riparian Corridors and Upland Wetlands Policies:

1. Creeks and natural riparian corridors and upland wetlands should be preserved whenever possible.

5. When disturbances to riparian corridors and upland wetlands cannot be avoided, appropriate measures should be required to restore, or compensate for damage to, the creeks or riparian corridors

6. The City encourages appropriate native plant restoration projects along riparian corridors, upland wetlands, and in adjacent upland areas.

7. The City should consider the preparation of a Riparian Restoration Action Plan to assess riparian conditions and identify potential riparian restoration programs and priorities.

8. Natural riparian corridors outside the Urban Service Area should be protected from disturbance associated with development (such as structures, roadways, sewage disposal facilities and overhead utility lines, except those required for flood control or bridging) by a minimum 150 foot setback from the top bank line, wherever feasible.

Species of Concern Policies:

1. Consideration should be given to setting aside conservation areas in the Bay and baylands, along riparian corridors, upland wetlands, and hillside areas to protect habitats of unique, threatened and endangered species of plants and animals, and to provide areas for educational and research purposes.

2. Habitat areas that support Species of Concern should be retained to the greatest extent feasible.

3. Recreational uses in wildlife refuges, nature preserves and wilderness areas in parks should be limited to those activities which have minimal impact on sensitive habitats.

4. New development on undeveloped properties throughout the City contributes to the regional loss of Burrowing Owl habitat. To offset this loss of habitat, the City should require either habitat preservation on or off site or other appropriate measures for habitat acquisition, habitat enhancement and maintenance of local habitat bank.

Water Resources Policies:

1. The City, in consultation with the Santa Clara Valley Water District, other public agencies and the SCVWD's Water Resources Protection Guidelines and Standards (2006 or as amended), should restrict or carefully regulate public and private development in streamside areas so as to protect and preserve the health, functions and stability of streams and stream corridors.

2. The City, in consultation with SCVWD, should restrict or carefully regulate public and private development in upland areas to prevent uncontrolled runoff that could impact the health and stability of streams.

3. Water resources should be utilized in a manner which does not deplete the supply of surface or groundwater or cause overdrafting of the underground water basin.

4. The City should work with the Santa Clara Valley Water District to establish appropriate public access and recreational uses on land adjacent to rivers, creeks, wetlands, and other significant water courses when water quality will be preserved.

6. The City should protect groundwater recharge areas, particularly creeks and riparian corridors.

7. When new development is proposed in areas where storm runoff will be directed into creeks upstream from groundwater recharge facilities, the potential for surface water and groundwater contamination should be assessed and appropriate preventative measures should be recommended.

8. The City shall require the proper construction and monitoring of facilities storing hazardous materials in order to prevent contamination of the surface water, groundwater and underlying aquifers. In furtherance of this policy, design standards for such facilities should consider high groundwater tables and/or the potential for freshwater or saltwater flooding.

9. The City should establish policies, programs and guidelines to adequately control the discharge of urban runoff and other pollutants into the City's storm drains.

10. The City should take a proactive role in the implementation of the Santa Clara Valley Urban Runoff Pollution Prevention Program.

Soils and Geologic Conditions Policies:

1. The City should require soils and geologic review of development proposals to assess such hazards as potential seismic hazards, surface ruptures, liquefaction, landholdings, mudsliding, erosion and sedimentation in order to determine if these hazards can be adequately mitigated.

2. The City should not locate public improvements and utilities in areas with identified soils and/or geologic hazards to avoid any extraordinary maintenance and operating expenses. When the location of public improvements and utilities in such areas cannot be avoided, effective mitigation measures should be implemented.

3. In areas susceptible to erosion, appropriate control measures should be required in conjunction with proposed development.

4. In order to prevent undue erosion of creek banks, the City should seek to retain creek channels in their natural state, where appropriate.

5. The Development Review process should consider the potential for any extraordinary expenditures of public resources to provide emergency services in the event of a man-made or natural disaster.

6. Development in areas subject to soils and geologic hazards should incorporate adequate mitigation measures.

7. The City should cooperate with the Santa Clara Valley Water District's efforts to prevent the recurrence of land subsidence.

Flooding Policies:

4. The City and the Santa Clara Valley Water District should cooperate to develop flood control facilities to protect areas from the occurrence of the "1%" or "100-year" flood or less frequent flood events when required by the State.

8. The City should cooperate with the Santa Clara Valley Water District to develop additional flood control retention facilities in areas where existing facilities are nearing capacity.

Fire Hazards Policies:

1. "Controlled burning" programs, agricultural uses such as grazing and special planting, and maintenance programs to reduce potential fire hazards in the hills and wilderness areas should be encouraged where appropriate.

Hazardous Materials Policies:

1. The City should require proper storage and disposal of hazardous materials to prevent leakage, potential explosions, fires, or the escape of harmful gases, and to prevent individually innocuous materials from combining to form hazardous substances, especially at the time of disposal.

Hazardous Waste Management Policies:

6. Transportation of hazardous waste from the point of origin to the appropriate hazardous waste management facility shall be by the most direct legal route, utilizing state or interstate highways whenever feasible, and shall minimize distances along residential and other non-industrial frontages to the fullest extent feasible.

9. Proper storage and disposal of hazardous wastes shall be required to prevent leaks, explosions, fires, or the escape of harmful gases, and to prevent materials from combining to form hazardous substances and wastes.

City of Santa Clara (2010)

The City of Santa Clara has prepared a Draft General Plan Update which covers the period from 2010 through 2035. As of the date of this document, the City's Planning Commission has not adopted the General Plan update. Therefore, relevant policies from the existing 2000-2010 General Plan (City of Santa Clara 2002) are presented below.

Archaeological and Cultural Resources Goals

5.6.3-G1 Protection and preservation of cultural resources, as well as archaeological and paleontological sites.

5.6.3-G2 Appropriate mitigation in the event that human remains, archaeological resources or paleontological resources are discovered during construction activities.

Archaeological and Cultural Resources Policies

5.6.3-P1 Require that new development avoid or reduce potential impacts to archaeological, paleontological and cultural resources.

5.6.3-P2 Encourage salvage and preservation of scientifically valuable paleontological or archaeological materials.

5.6.3-P3 Consult with California Native American tribes prior to considering amendments to the City's General Plan.

5.6.3-P4 Require that a qualified paleontologist/archaeologist monitor all grading and/or excavation if there is a potential to affect archeological or paleontological resources, including sites within 500 feet of natural water courses and in the Old Quad neighborhood.

5.6.3-P5 In the event that archaeological/paleontological resources are discovered, require that work be suspended until the significance of the find and recommended actions are determined by a qualified archaeologist/paleontologist.

5.6.3-P6 In the event that human remains are discovered, work with the appropriate Native American representative and follow the procedures set forth in State law.

Environmental Element

Soils and Geology Policies

1. Continue efforts to conserve natural resources and lessen the dependency on sanitary landfill by maximizing reclamation and reuses of materials and energy.

2. Support land reclamation in areas where erosion, landfill activities, hazardous materials storage or disposal, have occurred.

Hazardous Materials Policies

4. Regulate hazardous materials use, storage, disposal and clean-up to protect the health of humans and the environment within the City of Santa Clara.

Flora and Fauna Policies

6. Support programs for the protection of fish and wildlife and their habitats, including rare and endangered species.

7. Support conservation of riparian vegetation and habitat.

Water Resources Policies

8. Provide a reliable, safe supply of potable water adequate to meet present and future needs. Support efforts by the Santa Clara Valley Water District to reduce subsidence.

9. Promote conservation of water, water importation measures, and recharge of the aquifers, so to ensure an adequate water supply and remain within the allowable quantity of withdrawal or "safe yield" of the groundwater, so not to cause further compaction of aquifers and subsidence of land.

13. Support flood control improvements that will reduce serious flood hazards in the City, through coordination with the Santa Clara Valley Water District.

14. Regulate the type, location and intensity of land uses within flood-prone areas.

15. Identify and construct specific local storm drain facilities needed to accommodate a storm flow having a 10-year frequency.
16. Participate on a regional basis in a Non-Point-Source Control Program in order to reduce pollutants in storm water runoff.
17. Maximize water retention and reduce the quantity of water runoff.
18. Encourage programs to improve the quality of storm water runoff.

Air Quality Policies

19. Protect the air quality of the City of Santa Clara and its sphere of influence. Promote land use and transportation policies which maintain air quality.

Public Facilities and Services Element

Stormwater Policies

9. Maintain the integrity and capacity of the City's stormwater drain facilities.

City of Saratoga (2007)

Cultural Resources Element

Goal OSC 14 *Through coordination with and implementation of other related General Plan Policies, encourage preservation of the City's heritage by providing for the protection of irreplaceable historic and cultural resources representing significant elements of City and regional history.*

Goal LU 12 *Recognize the heritage of the City by seeking to protect historic and cultural resources, where feasible.*

Policy LU 12.9 Conduct reconnaissance level analyses of new development projects to ensure that no significant archeological, prehistoric, paleontological Native American resources would be disturbed. If such resources are found, appropriate steps shall be taken, consistent with CEQA requirements to protect these resources.

Open Space and Conservation Element

Watershed Protection and Water Quality:

Goal OSC 9: Protect existing watercourses in the community and enhance water quality in surface and subsurface water sources.

Policy OSC 9.1: Retain surface watercourses in their natural condition to the greatest extent possible.

Policy OSC 9.2: Concentrate development in those portions of the community least susceptible to soil erosion and minimize grading and the introduction of impervious surfaces. Where appropriate, consider the use of on-site detention or retention basins to minimize stormwater runoff from sites.

Policy OSC 9.3: Implement land use controls to protect watershed lands on the upper elevations of hillsides.

Goal OSC 11: Protect and enhance sensitive vegetative and wildlife habitat in the Saratoga Planning area.

Policy OSC 11.1: Minimize development that would encroach into important wildlife habitats, limit or restrict normal range areas, or restrict access to water food or shelter. This includes limitations on the installation of barrier fencing in hillside areas.

Policy OSC 11.5: Mature vegetation shall be preserved wherever possible.

Arbor Resources:

Goal OSC 12: Support appropriate management for sustaining the health and increasing the extent of arbor resources in the City. The specific vision is to increase overall tree cover, tree health and consequent tree benefits in an equitable, cost beneficial and sustainable manner.

Policy OSC 12.1: Development projects should include the preservation of protected trees and other significant trees. Any adverse affect on the health and longevity of native oak trees, protected or other significant trees should be avoided through appropriate design measures and construction practices. When tree preservation is not feasible, individual development projects shall include appropriate tree replacement as approved by the City.

Policy OSC 12.2: Trees used for new or replacement plantings should be selected primarily for low water use characteristics.

Policy OSC 12.4: It is the City's policy that forested lands in the City's Sphere of Influence shall be managed to maximize environmental protection and to discourage logging to the maximum extent possible, consistent with proper fire protection standards and practices.

Air Quality

Goal OSC 15: Improve local and regional air quality by ensuring that all development projects incorporate all feasible measures to reduce air pollutants.

Policy OSC 15.1: Require development projects to comply with Bay Area Air Quality Management District (BAAQMD) measures to reduce dust emissions due to grading and construction activities.

Safety Element

Goal 3.0: To reduce the damage to public and private property resulting from flooding and flood induced hazards.

Policy 3.1 The City shall continue to enforce its existing flood control regulations, and will cooperate with the Santa Clara Valley Water District when proposed projects will affect floodways in the City in order to prevent development activities from aggravating or causing potential flood problems.

City of Sunnyvale (2009)

Cultural Resources Sub-Element

Goal 6.3B *To enhance, preserve and protect Sunnyvale's heritage including natural features, the built environment, and significant artifacts.*

Policy 6.3B.1 Preserve existing landmarks and cultural resources and their environmental settings.

Policy 6.3B.10 *Archeological resources should be preserved whenever possible.*

Action Statements

6.3B.10a Whenever construction is proposed in an area which may contain archeological resources, a condition of approval for the project should provide that construction should cease and a qualified archeologist be called in the event that evidence of archeological resource is found.

Open Space and Recreation Sub-Element

Policy A2 Flood Hazards. Take measures to protect life and property from the effects of a 1% (100 year) flood.

Key Incentives:

A.2.1 Encourage the Santa Clara Valley Water District to reevaluate the capacity of Stevens Creek, Calabazas Creek, Sunnyvale East, West and El Camino Flood Control Channels in relation to a 1% (100 year) flood.

A.2.2 Encourage and monitor the work of the Santa Clara Valley Water District (SCVWD) in maintaining all creeks and channels in Sunnyvale free of flow inhibiting vegetation, debris and silt.

A.2.3 Encourage SCVWD to maintain their dikes and levees at least 3 feet above the 1% flood level and to provide continued inspection and repair from damage caused by burrowing animals.

A.2.4 Maintain the flood plain management practices as outlined by the Federal Emergency Management Agency and the Army Corps of Engineers.

Surface Runoff Sub-Element

GOAL A: Assure the reasonable protection of Beneficial Uses of creeks and San Francisco Bay, established in the Regional Board's Basin Plan, and protect environmentally sensitive areas.

Policy A.1. Continue to support the identification and development of BMPs suitable for use in the City through participation in the SCV NPS Control Program, American Public Works Association's Stormwater Quality Task Force, the Bay Area Stormwater Management Agencies Association, and similar organizations.

Policy A.2 Comply with regulatory requirements and participate in processes which may result in modifications to regulatory requirements.

Policy A.5 Prevent accelerated soil erosion.

GOAL B: Maintain storm drain system to prevent flooding

Policy B.1 Maintain and operate the storm drain system so that storm waters are drained from 95% of the streets within one hour after a storm stops.

GOAL C: Ensure that flood hazards are recognized

Policy C.1	Operate and maintain the storm drainage system at a level to minimize damages and ensure public safety.
Policy C.2	Prevent flooding to protect life and property.
Policy C.3	Monitor and plan for hydraulic changes due to global warming, earthquakes and/or subsidence.

Ordinances

Water Resources Protection Ordinance 06-1

SCVWD manages water resources under Water Resource Protection Ordinance 06-1. This ordinance protects water resources managed by SCVWD by regulating modifications, entry, use or access to SCVWD facilities and/or SCVWD easements. The ordinance clarifies the governance of lands along and adjacent to streams, provides model Guidelines and Standards for management of these lands, and reinforces the role of local jurisdictions in regulating land use, but encouraging consultation with SCVWD regarding lands they manage.

In an effort to clarify and streamline local permitting for streamside activities, representatives from SCVWD, cities, the County, and business, agriculture, streamside property owner, and environmental interests created a partnership known as the Water Resources Protection Collaborative. Together the collaborative developed a manual of model guideline and standards for land-use near streams.

Santa Clara County Historic Preservation Ordinance

The County adopted a Historic Preservation Ordinance, Ordinance NS-1100.96, in October, 2006. Basic components included in the Historic Preservation Ordinance are: 1) purpose and intent; 2) definitions; 3) commission powers and duties (revision of Chapter 5, Division A6-60 through 65); 4) landmark designation criteria and process (including a requirement for owner consent for designation); 5) landmark design review process and findings; 6) appeals; 7) economic hardship; 8) maintenance; and 9) enforcement.

Santa Clara County Noise Ordinance

The Santa Clara County Noise Ordinance (Santa Clara County Ordinance Code Section B11-150-158) contains the following restrictions on construction noise levels.

Section B11-154 (6) contains the following construction and demolition prohibitions:

(a) Operating or causing the operation of any tools or equipment used in construction, drilling, repair, alteration or demolition work between weekdays and Saturday hours of 7:00 p.m. and 7:00 a.m., or at any time on Sundays or holidays, such that the sound there from creates a noise disturbance across a residential or commercial real property line, except for emergency work of public service utilities or by variance. This section shall not apply to the use of domestic power tools as specified in section B11-154 (11).

(b) Where technically and economically feasible, construction activities shall be conducted in such a manner that the maximum noise levels at affected properties will not exceed those listed in the following schedule:

(i) Mobile equipment. Maximum noise levels for nonscheduled, intermittent, short-term operation (less than 10 days) of mobile equipment:

	Single- and Two-Family Dwelling Residential Area	Multi-Family Dwelling Residential Area	Commercial Area
Daily, except Sundays and legal holidays 7:00 a.m. – 7:00 p.m.	75 dBA	80 dBA	85 dBA
Daily, 7:00 p.m. to 7:00 a.m. and all day Sunday and legal holidays	50 dBA	55 dBA	60 dBA

(ii) Stationary equipment. Maximum noise levels for repetitively scheduled and relatively long-term operation (periods of 10 days or more) of stationary equipment:

	Single- and Two-Family Dwelling Residential Area	Multi-Family Dwelling Residential Area	Commercial Area
Daily, except Sundays and legal holidays 7:00 a.m. – 7:00 p.m.	60 dBA	65 dBA	70 dBA
Daily, 7:00 p.m. to 7:00 a.m. and all day Sunday and legal holidays	50 dBA	55 dBA	60 dBA

City of Campbell

The City of Campbell has a Historic Preservation Board that oversees the provisions of the Historic Preservation Ordinance and recommends measures to implement historic preservation to the City Council and City commissions.

Goal LUT-8 *Preservation of historic buildings, districts and cultural resources.*

Policy LUT-8.1 Historic Buildings, Landmarks and Districts and Cultural Resources: Preserve, rehabilitate or restore the City's historic buildings, landmarks, districts and cultural resources and retain the architectural integrity of established building patterns within historic residential neighborhoods to preserve the cultural heritage of the community.

Strategies

LUT-8.1i Altering or Demolishing Historic Resources: Establish procedures, including identifying alternatives, for proposals that significantly alter or demolish historic resources.

Goal CNR-1 *A high level of community participation in historic preservation efforts to build a strong sense of community identity.*

Policy CNR-1.1 Historic Resource Preservation: Ensure that the City and its citizens preserve historic resources as much as possible.

Strategies

CNR-1.1b Archaeological Resources: In accordance with CEQA and the State Public Resources Code, require the discontinuation of all work in the immediate vicinity and the preparation of a resource mitigation plan and monitoring program by a licensed archaeologist if archaeological resources are found on any sites within the City.

The city's municipal code contains the following relevant noise ordinances:

21.16.070(G)(7): Powered equipment. Powered equipment shall be limited to the hours of eight a.m. and seven p.m. Monday through Friday, and between the hours of nine a.m. and six p.m. Saturday, Sunday and nationally recognized holidays.

21.16.070(G)(8): City projects and activities. Noise from construction of public works projects and maintenance activities, or city-sponsored events, may be exempted from the provisions of the noise ordinance by the city manager or his designee should the public benefit of alternative work hours and or noise levels require such modification.

City of Cupertino

The city's municipal code contains the following relevant noise ordinances:

10.48.031: Special Exceptions.

A) The NCO [noise control officer] shall have the authority, consistent with this section, to grant special exceptions which may be requested.

B) Any person seeking a special exception pursuant to this section shall file an application with the NCO. The application shall contain information which demonstrates that bringing the source of sound, or activity for which the special exception is sought, into compliance with this chapter would constitute an unreasonable hardship on the applicant, on the community, or on other persons. Prior to issuance of an exception, the NCO shall notify owners and/or occupants of nearby properties which may be affected by such exceptions. Any individual who claims to be adversely affected by allowance of the special exceptions may file a statement with the NCO containing any information to support his claim. If the NCO finds that a sufficient controversy exists regarding an application, a public hearing may be held.

C) In determining whether to grant or deny the application, the NCO shall balance the hardship to the applicant, the community, and other persons of not granting the special exception against the adverse impact on the health, safety, and welfare of persons affected, the adverse impact on property affected, and any other adverse impacts of granting the special exception. Applicants for special exceptions and persons contesting special exceptions may be required to submit any information the NCO may reasonably require. In granting or denying an application, the NCO shall place on public file a copy of the decision and the reasons for denying or granting the special exception.

D) Special exceptions shall be granted by notice to the applicant containing all necessary conditions, including a time limit on the permitted activity. The special exception shall not become effective until all conditions are agreed to by the applicant. Noncompliance with any condition of the special exception shall terminate it and subject the person holding it to those provisions of this chapter regulating the source of sound or activity for which the special exception was granted.

E) Application for extension of time limits specified in special exceptions or for modification of other substantial conditions shall be treated like applications for initial special exceptions under subsection B of this section.

10.48.053: Grading, Construction and Demolition.

A) Grading, construction and demolition activities shall be allowed to exceed the noise limits of Section 10.48.040 [Daytime maximum defined as 60 dBA for residential and 65 dBA for non-residential; and nighttime maximum defined as 50 dBA for residential and 55 dBA for non-residential areas] during daytime hours; provided, that the equipment utilized has high-quality noise muffler and abatement devices installed and in good condition, and the activity meets one of the following two criteria:

1. No individual device produced a noise level more than eighty-seven dBA at a distance of twenty-five feet (7.5 meters); or
2. The noise level on any nearby property does not exceed eighty dBA.

B) Notwithstanding Section 10.48. 053A, it is a violation of this chapter to engage in any grading, street construction demolition or underground utility work within seven hundred fifty feet of a residential area on Saturdays, Sundays, and holidays, and during the nighttime period [weekdays eight p.m. to seven a.m., and weekends from six p.m. to nine a.m.], except as provided in Section 10.48.030.

C) Construction, other than street construction, is prohibited on holidays, except as provided in Sections 10.48.029 and 10.48.030.

D) Construction, other than street construction, is prohibited during nighttime periods unless it meets the nighttime standards of Section 10.48.040 [levels not exceeding 50 dBA for residential, 55 dBA for nonresidential areas].

City of Gilroy

GOAL: Protection of Gilroy residents from exposure to excessive noise and its effects through appropriate mitigation measures and responsive land use planning, especially in regard to noise-sensitive land uses such as schools, hospitals, and housing for seniors.

The city's municipal code contains the following relevant noise ordinances:

16.38: Hours of Construction.

(a) Unless otherwise provided for in a validly issued permit or approval, construction activities shall be limited to the hours of seven (7) a.m. and seven (7) p.m., Monday through Friday and nine (9) a.m. to seven (7) p.m. on Saturday. Construction activities shall not occur on Sundays or city holidays, which include: New Years Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day and Christmas. "Construction activities" are defined as including but not limited to, excavation, grading, paving, demolitions, construction, alteration or repair of any building, site, street or highway, delivery or removal of construction material to a site, or movement of construction materials on a site.

(b) In the event the chief building official or his or her designee determines that the public health and safety will not be impaired by the construction activities between the hours of seven (7) p.m. and seven (7) a.m., and that loss or inconvenience would result to any party in interest, the chief building official may grant permission for such work to be done between the hours of seven (7) p.m. and seven (7) a.m. upon an application being made at the time the permit for the work is issued or during the progress of the work.

(d) No third person, including but not limited to, landowners, construction company owners, contractors, subcontractors, or employers, shall permit or allow any person working on construction activities, which are under their ownership, control or direction to violate this provision. The provisions prescribed herein may be enforced by the chief building official or his or her designee or the police department. Violation of this section shall be a misdemeanor and each day such violation is committed or permitted to continue constitutes a separate offense and shall be punishable as such.

City of Los Altos

Goal 7: Minimize the amount of noise to which the community is exposed and the amount of noise created by future development and urban activities.

Policy 7.9: Minimize stationary noise sources and noise emanating from construction activities.

The city's municipal code contains the following relevant noise ordinances:

6.16.070(B)(6): Construction and demolition.

a). i. Single-family zoning districts. Operating or causing the operation of any tools or equipment used in construction, drilling, repair, alteration, or demolition work on weekdays before 7:00 a.m. and after 5:30 p.m. and on Saturdays before 9:00 a.m. or after 3:00 p.m. or any time on Sundays or the city observed holidays of New Year's Day, Memorial Day, Independence Day, Labor Day, Veterans' Day, Thanksgiving Day and Christmas Day, such that the sound therefrom creates a noise disturbance across a residential or commercial real property line, except for emergency work of public utilities or by special exception. This section shall apply to operations on residentially zoned property only. This section shall not apply to the use of lawn or garden tools as specified in subsection (B)(11) of this section;

ii. All other zoning districts. Operating or causing the operation of any tools or equipment used in construction, drilling, repair, alteration, or demolition work on weekdays before 7:00 a.m. and after 7:00 p.m. and Saturdays before 9:00 a.m. or after 6:00 p.m. or any time on Sundays or the city observed holidays of New Year's Day, Memorial Day, Independence Day, Labor Day, Veterans' Day, Thanksgiving Day and Christmas Day, such that the sound therefrom creates a noise disturbance across a residential or commercial real property line, except for emergency work of public service utilities or by special exception. This section shall apply to operations on properties other than residentially zoned property. This section shall not apply to the use of lawn or garden tools as specified in subsection (B)(11) of this section;

b. Where technically and economically feasible, construction activities shall be conducted in such a manner that the maximum noise levels at affected properties will not exceed those listed in the following schedules:

i. Mobile equipment. Maximum noise levels for the nonscheduled, intermittent, short-term operation (less than ten (10) days) of mobile equipment:

	All R1 Zoning Districts	All PCF and R3 Zoning Districts	All OA and C Zoning Districts
Daily, except Sundays and legal holidays 7:00 a.m.—7:00 p.m.	75 dBA	80 dBA	85 dBA
Daily, 7:00 p.m.—7:00 a.m. and all day Sundays and legal holidays	50 dBA	55 dBA	60 dBA

ii. Stationary equipment. Maximum noise levels for the respectively scheduled and relatively long-term operation (periods of ten (10) days or more) of stationary equipment [same as above.]

c. Deliveries, start-up and closing down. The construction times above shall apply to deliveries of materials and equipment, and arrival of workers, start-up and closing down and departure activities on a job site.

Town of Los Altos Hills

GOAL 1: Minimize noise levels so that residents may enjoy the amenities of living in a quiet, semi-rural community.

The town's municipal code contains the following relevant noise ordinances:

5-6.02: Outside construction or repair work- when prohibited- Emergency work exception.

It is unlawful for any person within a residential zone, or within a radius of five hundred (500) feet therefrom to do any of the following:

(a) To operate equipment or perform any outside construction or repair work on any building, structure, project, or to use any pneumatic hammer, steam or electric hoist, backhoe, bulldozer or dump truck or other construction type device, between the hours of 5:30 p.m. of one day and 8:00 a.m. of the next succeeding day on any Monday through Saturday, or at any time on any Sunday, or at any time on any public holiday; or

(b) To use any pneumatic hammer, steam or electric hoist, backhoe, bulldozer or dump truck or other construction type device, at any time on any Saturday, unless beforehand a permit therefore has been obtained in accordance with the provisions of this chapter.

Nothing contained in this chapter shall prohibit the operation of any equipment other than that prohibited in subsection (b) of this section, or the performance of any outside construction or repair work on any building, structure or project between the hours of 8:00 a.m. and 5:30 p.m. No permit shall be required to perform emergency work in the event of an emergency which imperils the public safety. This section shall not apply to the use of domestic power tools as specified in Section 5-6.03.

Town of Los Gatos

The town's municipal code contains the following relevant noise ordinances:

16.20.035: Construction.

Notwithstanding any other provision of this chapter, between the hours of 8:00 a.m. to 8:00 p.m., weekdays and 9:00 a.m. to 7:00 p.m. weekends and holidays, construction, alteration or repair activities which are authorized by a valid Town permit or as otherwise allowed by Town permit, shall be allowed if they meet at least one of the following noise limitations:

(1) No individual piece of equipment shall produce a noise level exceeding eighty-five (85) dBA at twenty-five (25) feet. If the device is located within a structure on the property, the measurement shall be made at distances as close to twenty-five (25) feet from the device as possible.

(2) The noise level at any point outside of the property plane shall not exceed eighty-five (85) dBA.

16.20.060: Powered Equipment.

a) Miscellaneous nonstationary noise sources such as; electric or gasoline lawn mowers, leafblowers, edge trimmers, hedge trimmers and other similar moveable noise sources shall be operated only during the hours of 8:00 a.m. to 8:00 p.m. weekdays and 9:00 a.m. to 7:00 p.m. weekends and holidays in residential or noise sensitive zones. The use of powered equipment in commercial, industrial or public space shall not be time limited. Powered equipment shall be exempt from all other limitations and provisions of this chapter.

City of Milpitas

6-G-1	Maintain land use compatibility with noise levels similar to those set by State guidelines.
6-G-2	Minimize unnecessary, annoying, or injurious noise.
6-I-13	Restrict the hours of operation, technique, and equipment used in all public and private construction activities to minimize noise impact. Include noise specifications in requests for bids and equipment information.

The city's municipal code contains the following relevant noise ordinances:

213-V-213-3: Unlawful to Create or Permit Disturbing Noise.

a) Residential Zone Regulations.

3.01 It shall be unlawful for any person in any district zoned for residential use (under the provisions of Chapter 10, Title XI of the Milpitas Municipal Code) to make, continue or cause to be made or continued any disturbing noise between the hours of 10:00 p.m. in the evening to 7:00 a.m. in the morning.

3.02 It shall be unlawful for any person owning, possessing or controlling any real property in any district zoned for residential use (under the provisions of Chapter 10, Title XI of the Milpitas Municipal Code) to permit or allow the making, continuing or causing to be made or continued any disturbing noise upon said real property between the hours of 10:00 p.m. in the evening to 7:00 a.m. in the morning.

3.03 The above prohibition against making, continuing or causing to be made or continued any disturbing noise in any district zoned for residential use shall not apply to the authorized collection of solid waste, recyclables, and/or yard trimmings by an authorized collector beginning at 6:00 a.m.

b) Site Construction Regulations.

No person shall engage or permit others to engage in construction of any building or related road or walkway, pool or landscape improvement or in the construction operations related thereto, including, delivery of construction materials, supplies, or improvements on or to a construction site except within the hours of 7:00 a.m. to 7:00 p.m. on weekdays and weekends.

No construction work shall be conducted or performed on the holidays indicated in Section V-213-2-2.05 of this chapter.

c) Exemption from Off-Site Construction Regulations.

Exempt from the Off-Site Construction Regulations of this article are:

(1) Emergency construction and repair that is necessary for protection of life and property,

(2) Operation preempted from local regulation by state law, such as construction of public school buildings,

(3) Furnishing utility-type service including construction and maintenance of utility facilities,

(4) Any work on an existing single-family or duplex (two-family) dwelling undertaken by the property owner,

(5) Operation to construct and maintain facilities within the public right-of-way as deemed necessary by the Public Works Director, and

(6) Any other circumstances where the City Manager deems that an exemption would be appropriate.

City of Monte Sereno

Goal HS-6 *Reduce noise levels within neighborhoods resulting from vehicular traffic and construction activity.*

Policy HS-6.1 Reduce noise levels in residential areas shall restricting truck traffic to designated routes and monitoring speed of local traffic.

Policy HS-6.2 Encourage the use of the latest noise control technology to minimize noise in residential neighborhoods.

Policy HS-6.3 Continue to enforce local and State noise regulations to minimize noise impacts associated with construction and public and private activities.

Policy HS-6.5 Cooperate with Santa Clara County, State and federal agencies, private businesses and individuals to control and maintain an acceptable noise environment in Monte Sereno.

The city's municipal code contains the following relevant noise ordinances:

9.07.020: Outside construction or repair work-where prohibited, emergency work exception.

It shall be unlawful for any person to operate equipment or perform any outside construction or repair work on any building, structure, project, or use any pneumatic hammer, steam or electric hoist, backhoe, bulldozer, or dump truck or other construction type device before the hour of 8:00 a.m. or after 8:00 p.m., on any Monday through Friday; or before the hours of 9:00 a.m. or after the hour of 5:00 p.m., on any Saturday; or at any time on any Sunday or public holiday. For the purposes of this Chapter, "public holiday" shall mean each day designated by resolution of the Monte Sereno City Council as an official holiday. If the City Manager finds evidence that an emergency exists that imperils the public safety, the City Manager may direct the construction or maintenance work to proceed during such hours as may be necessary for the duration of the emergency.

City of Morgan Hill

The city's municipal code contains the following relevant noise ordinances:

8.28.040: Enumeration of Unlawful Noises.

C. Blowers, Fans, and Combustion Engines. The operation of any noise-creating blower, power fan or internal combustion engine, the operation of which causes noise due to the explosion of operating gases or fluids, unless the noise from such blower or fan is muffled and such engine is equipped with a muffler device to deaden such noise;

D.1. Construction activities as limited below. "Construction activities" are defined as including but not limited to excavation, grading, paving, demolition, construction, alteration or repair of any building, site, street or highway, delivery or removal of construction material to a site, or movement of construction materials on a site. Construction activities are prohibited other than between the hours of seven a.m. and eight p.m., Monday through Friday and between the hours of nine a.m. to six p.m. on Saturday. Construction activities may not occur on Sundays or federal holidays. No third person, including but not limited to landowners, construction company owners, contractors, subcontractors, or employers, shall permit or allow any person working on construction activities that are under their ownership, control or direction to violate this provision. Construction activities may occur in the following cases without violation of this provision:

a. In the event of urgent necessity in the interests of the public health and safety, and then only with a permit from the chief building official, which permit may be granted for a period of not to exceed three days or less while the emergency continues and which permit may be renewed for periods of three days or less while the emergency continues.

b. If the chief building official determines that the public health and safety will not be impaired by the construction activities between the hours of eight p.m. and seven a.m., and that loss or inconvenience would result to any party in interest, the chief building official may grant permission for such work to be done between the hours of eight p.m. and seven a.m. upon an application being made at the time the permit for the work is issued or during the progress of the work.

d. Public work projects are exempt from this section and the public works director shall determine the hours of construction for public works projects.

City of Mountain View

The city's municipal code contains the following relevant noise ordinances:

SEC. 8.23. - Construction noise.

a. Hours of construction. No construction activity shall commence prior to 7:00 a.m. nor continue later than 6:00 p.m., Monday through Friday, nor shall any work be permitted on Saturday or Sunday or holidays unless prior written approval is granted by the building official. The term "construction activity" shall include any physical activity on the construction site or in the staging area, including the delivery of materials. In approving modified hours, the building official may specifically designate and/or limit the activities permitted during the modified hours.

b. Modification. At any time before commencement of or during construction activity, the building official may modify the permitted hours of construction upon twenty-four (24) hours written notice to the contractor, applicant, developer or owner. The building official can reduce the hours of construction activity below the 7:00 a.m. to 6:00 p.m. time frame or increase the allowable hours.

c. Sign required. If the hours of construction activity are modified then the general contractor, applicant, developer or owner shall erect a sign at a prominent location on the construction site to advise subcontractors and material suppliers of the working hours. The contractor, owner or applicant shall immediately produce upon request any written order or permit from the building official pursuant to this section upon the request of any member of the public, the police or city staff.

d. Violation. Violation of the allowed hours of construction activity, the building official's order, required signage or this section shall be a violation of this code.

City of Palo Alto

The city's municipal code contains the following relevant noise ordinances:

Noise Ordinance (Chapter 9.10). Chapter 9.10 describes the allowable noise limits for established land uses. In general noise limits on residential property is restricted to no greater than 6 dB above ambient while commercial and industrial property noise levels may not exceed 8 dB above ambient. Noise levels on public property are restricted to no more than 15 dB above ambient at a distance of 25 ft. More specific provisions of the ordinance which are relevant to the Proposed Project include:

9.10.060 - Special provisions.

(a) General Daytime Exception. Any noise source which does not produce a noise level exceeding seventy dBA at a distance of twenty-five feet under its most noisy condition of use shall be exempt from the provisions of Sections 9.10.030(a)[Residential property noise limits], 9.10.040 [Commercial and industrial property noise limits] and 9.10.050(a)[Public property noise limits] between the hours of eight a.m. and eight p.m. Monday through Friday, nine a.m. and eight p.m. on Saturday, except Sundays and holidays, when the exemption herein shall apply between ten a.m. and six p.m.

(b) Construction. Except for construction on residential property as described in subsection (c) of this section, construction, alteration and repair activities which are authorized by valid city building permit shall be prohibited on Sundays and holidays and shall be prohibited except between the hours of eight a.m. and six p.m. Monday through Friday, nine a.m. and six p.m. on Saturday provided that the construction, demolition or repair activities during those hours meet the following standards:

(1) No individual piece of equipment shall produce a noise level exceeding one hundred ten dBA at a distance of twenty-five feet. If the device is housed within a structure on the property, the measurement shall be made outside the structure at a distance as close to twenty-five feet from the equipment as possible.

(2) The noise level at any point outside of the property plane of the project shall not exceed one hundred ten dBA.

(3) The holder of a valid construction permit for a construction project in a non-residential zone shall post a sign at all entrances to the construction site upon commencement of construction, for the purpose of informing all contractors and subcontractors, their employees, agents, materialmen and all other persons at the construction site, of the basic requirements of this chapter.

(A) Said sign(s) shall be posted at least five feet above ground level, and shall be of a white background, with black lettering, which lettering shall be a minimum of one and one-half inches in height.

(B) said sign shall read as follows:

CONSTRUCTION HOURS
FOR NON-RESIDENTIAL PROPERTY
(Includes Any and All Deliveries)
MONDAY - FRIDAY.....8:00 a.m. to 6:00 p.m.
SATURDAY.....9:00 a.m. to 6:00 p.m.
SUNDAY/HOLIDAYS.....Construction prohibited.
Violation of this Ordinance is a misdemeanor punishable
by a maximum of six months in jail, $1,000 fine, or both.
Violators will be prosecuted.
P.A.M.C. §9.10.060(b).

(d) Other Equipment. Equipment used by city employees, city contractors, or public utility companies or their contractors, not covered by subsections (b) and (c) of this section, shall be allowed during the same hours as the exception set forth in subsection (b) of this section, providing no piece of equipment shall produce a noise level which exceeds one hundred ten dBA, measured at a distance of twenty-five feet from the equipment.

City of San Jose

Noise Policies:

1. The City's acceptable noise level objectives are 55 DNL as the long-range exterior noise quality level, 60 DNL as the short-range exterior noise quality level, 45 DNL as the interior noise quality level, and 76 DNL as the maximum exterior noise level necessary to avoid significant adverse health effects. These objectives are established for the City, recognizing that the attainment of exterior noise quality levels in the environs of the San José International and Reid-Hillview airports, the Downtown Core Area, and along major roadways may not be achieved in the time frame of this Plan. To achieve the noise objectives, the City should require appropriate site and building design, building construction and noise attenuation techniques in new residential development.

9. Construction operations should use available noise suppression devices and techniques.

The city's municipal code identifies the legal hours of construction occurring within 500 feet of a residential unit as being limited to the hours of 7 a.m. and 7 p.m. on weekdays. Such hours' restriction is applicable only to construction activities requiring a development permit or other approval from the City's Planning Department.

City of Saratoga

The city's municipal code contains the following relevant noise ordinances:

Noise Control Ordinance (Article 7-30) describes the allowable noise limits for established land uses. Specific provisions of the ordinance relevant to the Proposed Project are:

7-30.050 - General noise restriction.

(a)No person shall cause, produce, or allow to be produced, in any residential zoning district, any single event noise more than six dBA above the ambient noise level at the location where the single event noise source is measured.

(b)No person shall cause, produce or allow to be produced, in any office or commercial district, any single event noise more than eight dBA above the ambient noise level at the location where the single event noise source is measured.

7-30.060 - Noise Control: Exceptions for specific activities.

Exceptions for specific activities, so long as the noise level at any point twenty-five feet from the source of noise does not exceed 83 dBA, shall be permitted to exceed the standards set forth in Section 7-30.050 under the following conditions:

a) Residential construction. Residential construction, alteration or repair activities which are authorized by a valid City permit, or do not require the issuance of a City permit, may be conducted between the hours of 7:30 A.M. and 6:00 P.M. Monday through Friday and between the hours of 9:00 A.M. and 5:00 P.M. on Saturday. Residential construction shall be prohibited on Sunday and weekday holidays, with the exception of the following:

(1)Construction, alteration or repair activities that do not require a City permit may be conducted between the hours of 9:00 A.M. and 5:00 P.M. on Sunday and weekday holidays.

(2)Construction, alteration or repair activities which are authorized by a valid City permit and which do not exceed fifty percent of the existing main or accessory structure may be conducted between the hours of 9:00 A.M. and 5:00 P.M. on Sunday and weekday holidays.

(3)Temporary construction activities authorized by the Community Development Director upon his/her determination of an emergency.

A notice of applicable construction hour restrictions shall be posted conspicuously on site at all times for all exterior residential construction activity requiring a City permit.

(b) Commercial construction. Construction, alteration or repair activities in Commercial and Professional and Administrative Office zoning districts which are authorized by a valid City permit, or do not require the issuance of a City permit, may be conducted between the hours of 7:30 A.M. and 6:00 P.M. Monday through Friday. Commercial construction shall be prohibited on Saturday, Sunday and other holidays. The Community Development Director may grant temporary exemptions upon his/her determination of an emergency.

City of Santa Clara

The city's municipal code contains the following relevant noise ordinances:

Regulation of Noise and Vibration (Chapter 9.10) Specific provisions of the ordinance are:

9.10.230 Off-Street Regulation of Certain Construction Sites-Regulation.

No person shall engage or authorize others to engage in construction of any building or related road or walkway, pool or landscape improvement, or in construction operations related thereto, including delivery of construction materials, supplies, or improvements on or to a construction site within three hundred (300) feet of any residentially zoned property except within the hours of 7:00 A.M. to 6:00 P.M. following on weekdays other than holidays, Monday through Friday, inclusive; and within the hours of 9:00 A.M. to 6:00 P.M. following, inclusive, on any Saturday which is not a holiday. A holiday, for the purpose of this section, is each day or part thereof upon which any of the following holidays are observed pursuant to California law:

(a) January 1st.

(b) The third Monday in January (Martin Luther King, Jr., Day).

(c) The third Monday in February.

(d) The last Monday in May.

(e) July 4th.

(f) The first Monday in September.

(g) The Thursday in November appointed as Thanksgiving Day and the day immediately following.

(h) December 25th.

No such work is permitted on such holidays. (Ord. 1549 § 1, 7-15-86; Ord. 1556 § 1, 9-16-86. Formerly § 18-32.3).

9.10.240- Exemption from regulation.

Exempt from the regulations of this chapter are:

(a) Emergency construction and repair that is necessary for protection of life and property;

(b) Operation preempted from local regulation by State law, such as construction of public school buildings;

(c) Furnishing utility-type services including construction and maintenance of utility facilities;

(d) Public inspections; and

(e) Any work on an existing single-family or duplex (two-family) dwelling undertaken by the property owner.

City of Sunnyvale

The city's municipal code contains the following relevant noise ordinances

Title 16 Buildings and construction

16.08.030: Hours of construction-Time and noise limitations.

Construction activity shall be permitted between the hours of seven a.m. and six p.m. daily Mondays through Fridays. Saturday hours of operation shall be between eight a.m. and five p.m. There shall be no construction activity on Sundays or national holidays when city offices are closed.

Exceptions:

(b) As determined by the chief building official:

(1) No loud environmentally disruptive noises, such as air compressors without mufflers, continuously running motors or generators, loud playing musical instruments, radios, etc., will be allowed where such noises may be a nuisance to adjacent properties.

(2) Where emergency conditions exist, construction activity may be permitted at any hour or day of the week. Such emergencies shall be completed as rapidly as possible to prevent any disruption to other properties.

(3) Where additional construction activity will not be a nuisance to surrounding properties, based on location and type of construction, a waiver may be granted to allow hours of construction other than as stated in this section.

Appendix E
AIR QUALITY AND GREENHOUSE GAS EMISSIONS CALCULATIONS

Air Quality and Greenhouse Gas Emission Calculations

The tables shown below provide emission estimates associated with the SMP Update for two years: 2012 and 2020. For each year, emissions are shown in pounds per day and tons per year.

Emissions in pounds per day are shown for existing 2012 and existing 2020 conditions only. These existing condition emission estimates would not change under the Proposed Project conditions because the Proposed Project would not increase the amount of daily activity.

However, the Proposed Project would increase the total number of activity days per year, resulting in an increase in the annual emissions as compared to existing emissions. SCVWD estimates that the SMP Update would result in a 25 percent increase in the number of activity days per year. Therefore, the following tables also show existing and existing plus project annual emissions (and the net emissions increase associated with the 25 percent increase in activity days per year.)

The tables shown below include emission estimates for on-road vehicle travel, off-road vehicle travel, and pesticide use. The following procedures were used to estimate emissions for each of these three categories.

Off-Road Emissions

Off-road emissions were estimated using SCVWD's list of off-road SMP equipment. The California Air Resources Board's OFFROAD2007 software was used to estimate two sets of emissions for each piece of SMP equipment, one for 2012 and one for 2020. Emission estimates for 2020 are lower than for 2012 because OFFROAD2007 generates emissions by assuming a turnover in the vehicle fleet that would occur as newer vehicles replace older, higher emitting ones. For example, the average NOx emission rate for bulldozers in 2020 is substantially lower than for bulldozers in 2012. This is because OFFROAD2007 accounts for this off-road equipment turnover, resulting in lower average vehicle emissions over time.

The turnover rate assumes that SCVWD's off-road fleet turnover rate would be similar to the average turnover rate for Santa Clara County (as reflected in the OFFROAD2007 model). The emission estimates do not reflect any acceleration in fleet turnover that SCVWD may initiate.

Proposed SMP Update annual emissions for 2012 and 2020 are similar to existing SMP emissions, multiplied by 125 percent. This increase reflects a 25 percent increase in the number of annual operating days per year.

On-Road Emissions

Existing on-road vehicle emissions were based on SMP daily and annual vehicle miles traveled (VMT) estimates, as listed in Section 3.12, Traffic and Transportation. For existing conditions, the SMP generates 7,192 average VMT per day and 2,350,846 VMT per year. For the SMP Update, the Proposed Project would generate 7,192 VMT per day (unchanged from existing) and 2,478,547 VMT per year. Section 3.12, Traffic and Transportation contains a detailed description of how VMT was estimated.

The VMT estimates were used to estimate on-road emissions using the Caltrans version of the California Air Resources Board's EMFAC2007 model (CT-EMFAC). Separate CT-EMFAC modeling runs were made using the VMT estimates shown in the previous paragraph for the years 2012 and 2020. The differences in 2012 versus 2020 existing conditions emissions (for the same VMT) is because of the turnover in the vehicle fleet that occurs each year as older, higher emitting vehicles are removed from the fleet and newer, lower-emitting vehicles are added to the fleet. This turnover results in lower average vehicle emissions and is captured by the CT-EMFAC model. The on-road emission estimates used for this analysis assume that the turnover in the SMP on-road vehicle fleet would be similar to that of the fleet turnover for Santa Clara County.

Pesticide Emissions

Pesticide emissions were estimated using several steps. In step one, the amount of pesticides used by SMP were identified for a 4-year period, from 2007 through 2010. In step two, the volatile organic compound (VOC) content of each pesticide was identified, using existing information on each pesticide. In step three, the average annual usage of each pesticide for 2007 through 2010 was calculated, and that quantity was multiplied by each pesticide's VOC content. In step four, the quantities were totaled to get total reactive organic compound (ROG) emissions for existing conditions (ROG is assumed equal to VOC for this analysis). In step five, the quantity estimated in step four was multiplied by 125 percent to obtain the total pesticide-related ROG emissions for the Proposed Project.

2012 SCVWD Stream Maintenance Program Air Emission Estimates

Existing (ppd)	2012 ROG	2012 NOx	2012 PM_{10}	2012 $PM_{2.5}$	2012 CO_2e
Off-Road	44.2	388.3	16.3	16.3	48,565.7
On-Road	6.1	45.7	16.4	4.0	16,042.9
Pesticide Use	0.6				
Total	**50.9**	**434.0**	**32.8**	**20.4**	**64,608.6**

Existing (tpy)	2012 ROG	2012 NOx	2012 PM_{10}	2012 $PM_{2.5}$	2012 CO_2e
Off-Road	1.9	16.5	0.7	0.7	1,873.0
On-Road	0.8	5.9	2.1	0.5	1,892.5
Pesticide Use	0.0	-	-	-	
Total	**2.7**	**22.4**	**2.8**	**1.2**	**3,765.5**

Existing + Project (tpy)	2012 ROG	2012 NOx	2012 PM_{10}	2012 $PM_{2.5}$	2012 CO_2e
Off-Road	2.3	20.6	0.9	0.9	2,341.2
On-Road	0.9	7.2	2.3	0.6	2,022.0
Pesticide Use	0.0	-	-	-	-
Total	**3.3**	**27.8**	**3.1**	**1.4**	**4,363.2**

Net Change Project Increment (tpy)	2012 ROG	2012 NOx	2012 PM_{10}	2012 $PM_{2.5}$	2012 CO_2e
Off-Road	0.5	4.1	0.2	0.2	468.2
On-Road	0.1	1.2	0.1	0.1	129.4
Pesticide Use	0.0	-	-	-	-
Total	**0.6**	**5.4**	**0.3**	**0.2**	**597.7**

ppd – pounds per day; tpy – tons per year

Notes:

No change would occur in daily emissions because the amount of daily activity would not change from existing conditions. Consequently, Proposed Project would not exceed BAAQMD's pounds per day significance thresholds. Off-road emissions were estimated using equipment data and the California Air Resources Board's OFFROAD 2007 model. On-road emissions were estimated using vehicle miles traveled data, supplied by Fehr and Peers and the California Air Resources Board's EMFAC 2007 model. Pesticide use was based on a 4 year average of SCVWD's pesticide use (2007–2010) and the percentage of ROG in each pesticide, taken from the California Department of Pesticide Regulation's Pesticide VOC Emission Inventory. CO2 emissions estimated using EMFAC 2007 and OFFROAD 2007 were converted to CO2e using U.S. Environmental Protection Agency Guidance (available: http://www.epa.gov/OMS/climate/420f05004.htm#step4). CH4, N2O, and HFCs account for 5 percent of emissions, and the CO2 estimate was multiplied by 100/95 to incorporate the contribution of the other greenhouse gases.

Source: Data compiled by Horizon Water and Environment in 2011

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2020 SCVWD Stream Maintenance Program Air Emission Estimates

Existing (ppd)	2020 ROG	2020 NOx	2020 PM_{10}	2020 $PM_{2.5}$	2020 CO_2e
Off-Road	25.7	138.1	5.4	5.4	41,824.0
On-Road	3.5	20.0	16.6	3.6	15,041.0
Pesticide Use	0.6	-	-	-	-
Total	**29.7**	**158.1**	**22.0**	**9.0**	**56,865.0**

Existing (tpy)	2020 ROG	2020 NOx	2020 PM_{10}	2020 $PM_{2.5}$	2020 CO_2e
Off-Road	1.1	5.9	0.2	0.2	1,613.0
On-Road	0.5	2.6	2.2	0.5	1,774.3
Pesticide Use	0.0	-	-	-	-
Total	**1.6**	**8.5**	**2.4**	**0.7**	**3,387.3**

Existing + Project (tpy)	2020 ROG	2020 NOx	2020 PM_{10}	2020 $PM_{2.5}$	2020 CO_2e
Off-Road	1.4	7.3	0.3	0.3	2,016.2
On-Road	0.5	2.8	2.2	0.5	1,901.0
Pesticide Use	0.0	-	-	-	-
Total	**1.9**	**10.2**	**2.5**	**0.8**	**3,917.3**

Net Change Project Increment (tpy)	2020 ROG	2020 NOx	2020 PM_{10}	2020 $PM_{2.5}$	2020 CO_2e
Off-Road	0.3	1.5	0.1	0.1	403.2
On-Road	0.0	0.2	0.0	0.0	126.7
Pesticide Use	0.0	-	-	-	-
Total	**0.3**	**1.7**	**0.1**	**0.1**	**529.9**

ppd – pounds per day; tpy – tons per year

Notes:

No change would occur in daily emissions. Consequently, Proposed Project would not exceed BAAQMD's pounds per day significance thresholds. Off-road emissions were estimated using equipment data and the California Air Resources Board's OFFROAD 2007 model. On-road emissions were estimated using vehicle miles traveled data, supplied by Fehr and Peers and the California Air Resources Board's EMFAC 2007 model. Pesticide use was based on a 4 year average of SCVWD's pesticide use (2007–2010) and the percentage of ROG in each pesticide, taken from the California Department of Pesticide Regulation's Pesticide VOC Emission Inventory. CO2 emissions estimated using EMFAC 2007 and OFFROAD 2007 were converted to CO2e using U.S. Environmental Protection Agency Guidance (available: http://www.epa.gov/OMS/climate/420f05004.htm#step4). CH4, N2O, and HFCs account for 5 percent of emissions, and the CO2 estimate was multiplied by 100/95 to incorporate the contribution of the other greenhouse gases.

Source: Data compiled by Horizon Water and Environment in 2011

Appendix F
TAXONOMIC CROSSWALK BETWEEN THE JEPSON MANUAL FIRST EDITION AND SECOND EDITION (SECOND EDITION IN PREPARATION)

Family Name, Jepson Manual First Edition	Scientific Name, Jepson Manual First Edition	Family Name, Jepson Manual Second Edition	Scientific Name, Jepson Manual Second Edition
Aceraceae	*Acer macrophyllum*	Sapindaceae	*Acer macrophyllum*
Aceraceae	*Acer negundo*	Sapindaceae	*Acer negundo*
Aizoaceae	*Mesembryanthemum nodiflorum*	Aizoaceae	*Mesembryanthemum nodiflorum*
Aizoaceae	*Tetragonia tetragonioides*	Aizoaceae	*Tetragonia tetragonioides*
Anacardiaceae	*Toxicodendron diversilobum*	Anacardiaceae	*Toxicodendron diversilobum*
Apiaceae	*Conium maculatum*	Apiaceae	*Conium maculatum*
Apiaceae	*Eryngium aristulatum* var. *hooveri*	Apiaceae	*Eryngium aristulatum* var. *hooveri*
Apiaceae	*Foeniculum vulgare*	Apiaceae	*Foeniculum vulgare*
Apiaceae	*Lomatium observatorium*	Apiaceae	*Lomatium observatorium*
Apiaceae	*Perideridia gairdneri*	Apiaceae	*Perideridia gairdneri*
Apiaceae	*Sanicula saxatilis*	Apiaceae	*Sanicula saxatilis*
Apocynaceae	*Vinca major*	Apocynaceae	*Vinca major*
Araliaceae	*Hedera helix*	Araliaceae	*Hedera helix*
Asteraceae	*Artemisia californica*	Asteraceae	*Artemisia californica*
Asteraceae	*Baccharis pilularis*	Asteraceae	*Baccharis pilularis*
Asteraceae	*Baccharis salicifolia*	Asteraceae	*Baccharis salicifolia*
Asteraceae	*Balsamorhiza macrolepis* var. *macrolepis*	Asteraceae	*Balsamorhiza macrolepis*
Asteraceae	*Carduus pycnocephalus*	Asteraceae	*Carduus pycnocephalus* ssp. *pycnocephalus*
Asteraceae	*Cirsium fontinale* var. *campylon*	Asteraceae	*Cirsium fontinale* var. *campylon*
Asteraceae	*Cirsium praeteriens*	Asteraceae	*Cirsium praeteriens*
Asteraceae	*Coreopsis hamiltonii*	Asteraceae	*Leptosyne hamiltonii*
Asteraceae	*Eriophyllum jepsonii*	Asteraceae	*Eriophyllum jepsonii*
Asteraceae	*Grindelia stricta* var. *angustifolia*	Asteraceae	*Grindelia stricta* var. *angustifolia*
Asteraceae	*Helianthus bolanderi*	Asteraceae	*Helianthus exilis*
Asteraceae	*Hemizonia parryi*	Asteraceae	*Centromadia parryi*

Family Name, Jepson Manual First Edition	Scientific Name, Jepson Manual First Edition	Family Name, Jepson Manual Second Edition	Scientific Name, Jepson Manual Second Edition
	ssp. *congdonii*		ssp. *congdonii*
Asteraceae	*Isocoma menziesii* var. *diabolica*	Asteraceae	*Isocoma menziesii* var. *diabolica*
Asteraceae	*Jaumea carnosa*	Asteraceae	*Jaumea carnosa*
Asteraceae	*Lasthenia conjugens*	Asteraceae	*Lasthenia conjugens*
Asteraceae	*Layia chrysanthemoides*	Asteraceae	*Layia chrysanthemoides*
Asteraceae	*Layia platyglossa*	Asteraceae	*Layia platyglossa*
Asteraceae	*Lessingia hololeuca*	Asteraceae	*Lessingia hololeuca*
Asteraceae	*Lessingia micradenia* var. *glabrata*	Asteraceae	*Lessingia micradenia* var. *glabrata*
Asteraceae	*Lessingia tenuis*	Asteraceae	*Lessingia tenuis*
Asteraceae	*Malacothrix phaeocarpa*	Asteraceae	*Malacothrix phaeocarpa*
Asteraceae	*Micropus amphibolus*	Asteraceae	*Micropus amphibolus*
Asteraceae	*Microseris sylvatica*	Asteraceae	*Microseris sylvatica*
Asteraceae	*Pentachaeta exilis* ssp. *aeolica*	Asteraceae	*Pentachaeta exilis* ssp. *aeolica*
Asteraceae	*Picris echioides*	Asteraceae	*Helminthotheca echioides*
Asteraceae	*Psilocarphus brevissimus* var. *multiflorus*	Asteraceae	*Psilocarphus brevissimus* var. *multiflorus*
Asteraceae	*Senecio aphanactis*	Asteraceae	*Senecio aphanactis*
Azollaceae	*Azolla mexicana*	Azollaceae	*Azolla mexicana*
Betulaceae	*Alnus rhombifolia*	Betulaceae	*Alnus rhombifolia*
Boraginaceae	*Amsinckia lunaris*	Boraginaceae	*Amsinckia lunaris*
Boraginaceae	*Plagiobothrys chorisianus var. hickmanii*	Boraginaceae	*Plagiobothrys chorisianus var. hickmanii*
Boraginaceae	*Plagiobothrys glaber*	Boraginaceae	*Plagiobothrys glaber*
Boraginaceae	*Plagiobothrys myosotoides*	Boraginaceae	*Plagiobothrys verrucosus*
Boraginaceae	*Plagiobothrys uncinatus*	Boraginaceae	*Plagiobothrys uncinatus*
Brassicaceae	*Erysimum franciscanum*	Brassicaceae	*Erysimum franciscanum*

Family Name, Jepson Manual First Edition	Scientific Name, Jepson Manual First Edition	Family Name, Jepson Manual Second Edition	Scientific Name, Jepson Manual Second Edition
Brassicaceae	*Lepidium latifolium*	Brassicaceae	*Lepidium latifolium*
Brassicaceae	*Streptanthus albidus* ssp. *albidus*	Brassicaceae	*Streptanthus glandulosus* ssp. *albidus*
Brassicaceae	*Streptanthus albidus ssp. peramoenus*	Brassicaceae	*Streptanthus glandulosus* ssp. *glandulosus*
Brassicaceae	*Streptanthus callistus*	Brassicaceae	*Streptanthus callistus*
Brassicaceae	*Tropidocarpum capparideum*	Brassicaceae	*Tropidocarpum capparideum*
Campanulaceae	*Campanula exigua*	Campanulaceae	*Campanula exigua*
Campanulaceae	*Campanula sharsmithiae*	Campanulaceae	*Campanula sharsmithiae*
Campanulaceae	*Downingia* spp.	Campanulaceae	*Downingia* spp.
Campanulaceae	*Legenere limosa*	Campanulaceae	*Legenere limosa*
Caprifoliaceae	*Sambucus nigra* ssp. *caerulea*	Adoxaceae	*Sambucus mexicana*
Caprifoliaceae	*Symphoricarpos albus var. laevigatus*	Caprifoliaceae	*Symphoricarpos albus var. laevigatus*
Caryophyllaceae	*Stellaria media*	Caryophyllaceae	*Stellaria media*
Chenopodiaceae	*Atriplex depressa*	Chenopodiaceae	*Atriplex depressa*
Chenopodiaceae	*Atriplex joaquiniana*	Chenopodiaceae	*Atriplex joaquiniana*
Chenopodiaceae	*Atriplex semibaccata*	Chenopodiaceae	*Atriplex semibaccata*
Chenopodiaceae	*Atriplex triangularis*	Chenopodiaceae	*Atriplex prostrata*
Chenopodiaceae	*Salicornia europaea*	Chenopodiaceae	*Salicornia depressa*
Chenopodiaceae	*Salicornia virginica*	Chenopodiaceae	*Salicornia pacifica*
Chenopodiaceae	*Salsola soda*	Chenopodiaceae	*Salsola soda*
Chenopodiaceae	*Suaeda californica*	Chenopodiaceae	*Suaeda californica*
Convolvulaceae	*Calystegia collina* ssp. *venusta*	Convolvulaceae	*Calystegia collina* ssp. *venusta*
Cornaceae	*Cornus sericea*	Cornaceae	*Cornus sericea*
Crassulaceae	*Dudleya setchellii*	Crassulaceae	*Dudleya abramsii* ssp. *setchellii*
Cuscutaceae	*Cuscuta salina*	Convolvulaceae	*Cuscuta salina*
Ericaceae	*Arctostaphylos andersonii*	Ericaceae	*Arctostaphylos andersonii*

Family Name, Jepson Manual First Edition	Scientific Name, Jepson Manual First Edition	Family Name, Jepson Manual Second Edition	Scientific Name, Jepson Manual Second Edition
Ericaceae	*Arctostaphylos glauca*	Ericaceae	*Arctostaphylos glauca*
Ericaceae	*Arctostaphylos regismontana*	Ericaceae	*Arctostaphylos regismontana*
Fabaceae	*Astragalus tener* var. *tener*	Fabaceae	*Astragalus tener* var. *tener*
Fabaceae	*Hoita strobilina*	Fabaceae	*Hoita strobilina*
Fabaceae	*Lupinus* spp.	Fabaceae	*Lupinus* spp.
Fabaceae	*Melilotus albus*	Fabaceae	*Melilotus albus*
Fabaceae	*Robinia pseudoacacia*	Fabaceae	*Robinia pseudoacacia*
Fabaceae	*Trifolium amoenum*	Fabaceae	*Trifolium amoenum*
Fabaceae	*Trifolium depauperatum* var. *hydrophilum*	Fabaceae	*Trifolium hydrophilum*
Fabaceae	*Trifolium variegatum*	Fabaceae	*Trifolium variegatum*
Fagaceae	*Quercus agrifolia*	Fagaceae	*Quercus agrifolia*
Fagaceae	*Quercus douglasii*	Fagaceae	*Quercus douglasii*
Fagaceae	*Quercus durata*	Fagaceae	*Quercus durata*
Fagaceae	*Quercus ilex*	Fagaceae	*Quercus ilex*
Fagaceae	*Quercus lobata*	Fagaceae	*Quercus lobata*
Frankeniaceae	*Frankenia salina*	Frankeniaceae	*Frankenia salina*
Garryaceae	*Garrya congdonii*	Garryaceae	*Garrya congdonii*
Geraniaceae	*Erodium macrophyllum*	Geraniaceae	*California macrophylla*
Geraniaceae	*Erodium* spp.	Geraniaceae	*Erodium* spp.
Hippocastanaceae	*Aesculus californica*	Sapindaceae	*Aesculus californica*
Hydrophyllaceae	*Phacelia phacelioides*	Boraginaceae	*Phacelia phacelioides*
Juglandaceae	*Juglans californica* ssp. *hindsii*	Juglandaceae	*Juglans hindsii*
Lamiaceae	*Acanthomintha lanceolata*	Lamiaceae	*Acanthomintha lanceolata*
Lamiaceae	*Monardella antonina* ssp. *antonina*	Lamiaceae	*Monardella villosa* ssp. *villosa*
Lamiaceae	*Monardella villosa* ssp. *globosa*	Lamiaceae	*Monardella villosa* ssp. *villosa*
Lamiaceae	*Salvia mellifera*	Lamiaceae	*Salvia mellifera*

Family Name, Jepson Manual First Edition	Scientific Name, Jepson Manual First Edition	Family Name, Jepson Manual Second Edition	Scientific Name, Jepson Manual Second Edition
Lauraceae	*Umbellularia californica*	Lauraceae	*Umbellularia californica*
Lythraceae	*Lythrum hyssopifolia*	Lythraceae	*Lythrum hyssopifolia*
Malvaceae	*Malacothamnus arcuatus*	Malvaceae	*Malacothamnus fasciculatus*
Malvaceae	*Malacothamnus davidsonii*	Malvaceae	*Malacothamnus davidsonii*
Malvaceae	*Malacothamnus hallii*	Malvaceae	*Malacothamnus hallii*
Malvaceae	*Sidalcea malachroides*	Malvaceae	*Sidalcea malachroides*
Myrtaceae	*Eucalyptus* spp.	Myrtaceae	*Eucalyptus* spp.
Onagraceae	*Clarkia breweri*	Onagraceae	*Clarkia breweri*
Onagraceae	*Clarkia concinna* ssp. *automixa*	Onagraceae	*Clarkia concinna* ssp. *automixa*
Onagraceae	*Ludwigia* spp.	Onagraceae	*Ludwigia* spp.
Papaveraceae	*Eschscholzia californica*	Papaveraceae	*Eschscholzia californica*
Papaveraceae	*Meconella oregana*	Papaveraceae	*Meconella oregana*
Papaveraceae	*Platystemon californicus*	Papaveraceae	*Platystemon californicus*
Plantaginaceae	*Plantago erecta*	Plantaginaceae	*Plantago erecta*
Platanaceae	*Platanus racemosa*	Platanaceae	*Platanus racemosa*
Plumbaginaceae	*Limonium californicum*	Plumbaginaceae	*Limonium californicum*
Polemoniaceae	*Eriastrum brandegeeae*	Polemoniaceae	*Eriastrum brandegeeae*
Polemoniaceae	*Eriastrum brandegeeae*	Polemoniaceae	*Eriastrum tracyi*
Polemoniaceae	*Linanthus acicularis*	Polemoniaceae	*Leptosiphon acicularis*
Polemoniaceae	*Linanthus ambiguus*	Polemoniaceae	*Leptosiphon ambiguus*
Polemoniaceae	*Linanthus grandiflorus*	Polemoniaceae	*Leptosiphon grandiflorus*
Polemoniaceae	*Navarretia cotulifolia*	Polemoniaceae	*Navarretia cotulifolia*
Polygonaceae	*Chorizanthe robusta* ssp. *robusta*	Polygonaceae	*Chorizanthe robusta* ssp. *robusta*

Family Name, Jepson Manual First Edition	Scientific Name, Jepson Manual First Edition	Family Name, Jepson Manual Second Edition	Scientific Name, Jepson Manual Second Edition
Polygonaceae	*Eriogonum argillosum*	Polygonaceae	*Eriogonum argillosum*
Polygonaceae	*Eriogonum nudum* var. *decurrens*	Polygonaceae	*Eriogonum nudum* var. *decurrens*
Polygonaceae	*Eriogonum umbellatum* var. *bahiiforme*	Polygonaceae	*Eriogonum umbellatum* var. *bahiiforme*
Polygonaceae	*Persicaria* spp.	Polygonaceae	*Persicaria* spp.
Polygonaceae	*Polygonum* spp.	Polygonaceae	*Polygonum* spp.
Portulacaceae	*Calandrinia breweri*	Montiaceae	*Calandrinia breweri*
Portulacaceae	*Calyptridium parryi* var. *hesseae*	Montiaceae	*Calyptridium parryi* var. *hesseae*
Primulaceae	*Androsace elongata* ssp. *acuta*	Primulaceae	*Androsace elongata* ssp. *acuta*
Ranunculaceae	*Delphinium californicum* ssp. *interius*	Ranunculaceae	*Delphinium californicum* ssp. *interius*
Ranunculaceae	*Ranunculus californicus*	Ranunculaceae	*Ranunculus californicus*
Rhamnaceae	*Ceanothus ferrisiae*	Rhamnaceae	*Ceanothus ferrisiae*
Rhamnaceae	*Rhamnus californica*	Rhamnaceae	*Frangula californica*
Rosaceae	*Adenostoma fasciculatum*	Rosaceae	*Adenostoma fasciculatum*
Rosaceae	*Heteromeles arbutifolia*	Rosaceae	*Heteromeles arbutifolia*
Rosaceae	*Rosa californica*	Rosaceae	*Rosa californica*
Rosaceae	*Rubus discolor*	Rosaceae	*Rubus armeniacus*
Rubiaceae	*Galium andrewsii*	Rubiaceae	*Galium andrewsii*
Rubiaceae	*Galium aparine*	Rubiaceae	*Galium aparine*
Salicaceae	*Populus fremontii* ssp. *fremontii*	Salicaceae	*Populus fremontii* ssp. *fremontii*
Salicaceae	*Salix exigua*	Salicaceae	*Salix exigua*
Salicaceae	*Salix laevigata*	Salicaceae	*Salix laevigata*
Salicaceae	*Salix lasiolepis*	Salicaceae	*Salix lasiolepis*
Salicaceae	*Salix lucida ssp. lasiandra*	Salicaceae	*Salix lasiandra* var. *lasiandra*
Scrophulariaceae	*Castilleja affinis* ssp.	Orobanchaceae	*Castilleja affinis* ssp.

Family Name, Jepson Manual First Edition	Scientific Name, Jepson Manual First Edition	Family Name, Jepson Manual Second Edition	Scientific Name, Jepson Manual Second Edition
	neglecta		*neglecta*
Scrophulariaceae	*Castilleja exserta*	Orobanchaceae	*Castilleja exserta*
Scrophulariaceae	*Castilleja rubicundula* ssp. *rubicundula*	Orobanchaceae	*Castilleja rubicundula* ssp. *rubicundula*
Scrophulariaceae	*Collinsia multicolor*	Plantaginaceae	*Collinsia multicolor*
Scrophulariaceae	*Cordylanthus maritimus* ssp. *palustris*	Orobanchaceae	*Chloropyron maritimum* ssp. *palustre*
Scrophulariaceae	*Orthocarpus* spp.	Orobanchaceae	*Orthocarpus* spp.
Scrophulariaceae	*Penstemon rattanii* var. *kleei*	Plantaginaceae	*Penstemon rattanii* var. *kleei*
Simaroubaceae	*Ailanthus altissima*	Simaroubaceae	*Ailanthus altissima*
Thymelaeaceae	*Dirca occidentalis*	Thymelaeaceae	*Dirca occidentalis*
Ulmaceae	*Ulmus* spp.	Ulmaceae	*Ulmus* spp.
Cyperaceae	*Eleocharis macrostachya*	Cyperaceae	*Eleocharis macrostachya*
Cyperaceae	*Scirpus maritimus*	Cyperaceae	*Bolboschoenus maritimus* ssp. *paludosis*
Cyperaceae	*Scirpus robustus*	Cyperaceae	*Bolboschoenus robustus*
Cyperaceae	*Cyperus eragrostis*	Cyperaceae	*Cyperus eragrostis*
Iridaceae	*Iris longipetala*	Iridaceae	*Iris longipetala*
Juncaceae	*Juncus* spp.	Juncaceae	*Juncus* spp.
Liliaceae	*Allium peninsulare* var. *franciscanum*	Alliaceae	*Allium peninsulare* var. *franciscanum*
Liliaceae	*Allium sharsmithiae*	Alliaceae	*Allium sharsmithiae*
Liliaceae	*Calochortus umbellatus*	Liliaceae	*Calochortus umbellatus*
Liliaceae	*Frittilaria agrestis*	Liliaceae	*Frittilaria agrestis*
Liliaceae	*Fritillaria falcata*	Liliaceae	*Fritillaria falcata*
Liliaceae	*Fritillaria liliacea*	Liliaceae	*Fritillaria liliacea*
Orchidaceae	*Cypripedium fasciculatum*	Orchidaceae	*Cypripedium fasciculatum*
Orchidaceae	*Piperia candida*	Orchidaceae	*Piperia candida*
Orchidaceae	*Piperia michaelii*	Orchidaceae	*Piperia michaelii*

Family Name, Jepson Manual First Edition	Scientific Name, Jepson Manual First Edition	Family Name, Jepson Manual Second Edition	Scientific Name, Jepson Manual Second Edition
Orchidaceae	*Piperia leptopetala*	Orchidaceae	*Piperia leptopetala*
Poaceae	*Arundo donax*	Poaceae	*Arundo donax*
Poaceae	*Avena* spp.	Poaceae	*Avena* spp.
Poaceae	*Bromus diandrus*	Poaceae	*Bromus diandrus*
Poaceae	*Distichlis spicata*	Poaceae	*Distichlis spicata*
Poaceae	*Elymus multisetus*	Poaceae	*Elymus multisetus*
Poaceae	*Koeleria macrantha*	Poaceae	*Koeleria macrantha*
Poaceae	*Leymus triticoides*	Poaceae	*Eleymus triticoides*
Poaceae	*Lolium multiflorum*	Poaceae	*Festuca perennis*
Poaceae	*Nassella pulchra*	Poaceae	*Stipa pulchra*
Poaceae	*Polypogon monspeliensis*	Poaceae	*Polypogon monspeliensis*
Poaceae	*Spartina alterniflora*	Poaceae	*Spartina alterniflora*
Poaceae	*Spartina foliosa*	Poaceae	*Spartina foliosa*
Typhaceae	*Sparganium* spp.	Typhaceae	*Sparganium* spp.
Typhaceae	*Typha* spp.	Typhaceae	*Typha* spp.

Appendix G
SPECIAL-STATUS AND LOCALLY SIGNIFICANT PLANT SPECIES CONSIDERED BUT REJECTED FOR OCCURRENCE IN THE PROJECT AREA

Special-Status and Locally Significant Plant Species Considered but Rejected for Occurrence in the Project Area

Scientific Name	Common Name	No suitable habitat	Outside of the elevation range	Believed to be extirpated from Santa Clara County	Lack of associated species	Widely distributed CNPS List 3 and 4 Species
Acanthomintha lanceolata	Santa Clara thornmint					X
Allium sharsmithiae	Sharsmith's onion	X	X			
Androsace elongate ssp. *acuta*	California androsace					X
Arctostaphylos regismontana	Kings Mountain manzanita				X	
Astragalus tener var. *tener*	Alkali milk-vetch			X		
Atriplex joaquiniana	San Joaquin spearscale			X		
Azolla mexicana	Mexican mosquito fern					X
Calandrinia breweri	Brewer's calandrinia					X
Calochortus umbellatus	Oakland star tulip					X
Calyptridium parryi var. *hesseae*	Santa Cruz Mountains pussypaws	X				
Calystegia collina ssp. *venusta*	South Coast Range morning-glory		X			
Campanula exigua	Chaparral harebell	X	X			
Campanula sharsmithiae	Sharsmith's harebell	X	X			
Chorizanthe robusta var. robusta	Robust spineflower			X		
Cirsium praeteriens	Lost thistle			X		
Clarkia breweri	Brewer's clarkia					X
Cordylanthus maritimus ssp. palustris	Point Reyes bird's beak			X		
Coreopsis hamiltonii	Mt. Hamilton coreopsis	X	X			
Cypripedium fasciculatum	Clustered lady's-slipper					X
Eriastrum brandegeeae	Brandegee's eriastrum	X	X			
Eriastrum tracyi	Tracy's eriastrum		X			
Eriogonum argillosum	Clay buckwheat					X
Eriogonum nudum var. *decurrens*	Ben Lomond buckwheat					X
Eriogonum umbellatum var. *bahiiforme*	Bay buckwheat					X
Eriophyllum jepsonii	Jepson's wooly sunflower					X
Erysimum franciscanum	San Francisco wallflower					X
Frittilaria agrestis	Stinkbells					X
Galium andrewsii	Phlox-leaf serpentine bedstraw					X
Helianthus exilis	Serpentine sunflower					X
Iris longipetala	Coast iris					X
Lasthenia conjugens	Contra Costa goldfields			X		
Legenere limosa	Legenere	X				

Special-Status and Locally Significant Plant Species Considered but Rejected for Occurrence in the Project Area

Scientific Name	Common Name	No suitable habitat	Outside of the elevation range	Believed to be extirpated from Santa Clara County	Lack of associated species	Widely distributed CNPS List 3 and 4 Species
Leptosiphon acicularis	Bristly leptosiphon					X
Leptosiphon ambiguus	Serpentine leptosiphon					X
Leptosiphon grandiflorus	Large-flowered leptosiphon					X
Lessingia tenuis	Spring lessingia					X
Lomatium observatorium	Mt. Hamilton lomatium	X	X			
Malacotrhix phaeocarpa	Dusky-fruited malacothix					X
Micropus amphiboles	Mt. Diablo cottonweed					X
Microserus sylvatica	Sylvan microseris					X
Monardella antonina ssp. *antonina*	San Antonio Hills monardella	X	X			
Navarretia cotulifolia	Cotula navarretia					X
Penstemon rattanii var. *kleei*	Santa Cruz Mountains beardtongue	X	X			
Pentachaeta exilis ssp. *aeolica*	San Benito pentachaeta	X	X			
Perideridia gairdneri	Gairdner's yampah					X
Piperia candida	White-flowered rein orchid					X
Piperia michaelii	Michael's rein orchid					X
Phacelia phacelioides	Mt. Diablo phacelia	X	X			
Piperia leptopetala	Narrow-petaled rein orchid	X	X			
Plagiobothrys chorisianus var. hickmanii	Hickman's popcorn flower					X
Plagiobothrys glaber	Hairless popcorn-flower			X		
Plagiobothrys myosotoides	Forget-me-not popcorn-flower	X	X			
Psilocarphus brevissimus var. *multiflorus*	Delta woolly-marbles					X
Sanicula saxatilis	Rock sanicle		X			
Senecio aphanactis	Rayless ragwort	X				
Sidalcea malachroides	Maple-leaved checkerbloom					X
Streptanthus callistus	Mt. Hamilton jewel-flower	X	X			
Suaeda californica	California seablite			X		
Trifolium amoenum	Two-fork clover			X		
Tropidocarpum capparideum	Caper-fruited tropidocarpum			X		

Appendix H
DETAILED DESCRIPTIONS OF SPECIAL-STATUS AND LOCALLY SIGNIFICANT PLANT SPECIES POTENTIALLY OCCURRING IN THE PROJECT AREA

Federal or State Endangered or Threatened Species

Tiburon Paintbrush (*Castilleja affinis* ssp. *neglecta*). Federal Listing Status: Endangered; State Listing Status: Threatened; CNPS List: 1B.2. Tiburon paintbrush is a perennial, hemiparasitic herb in the figwort family (*Scrophulariaceae*) that blooms from April to June and dies back to a woody base in July and August. Because of its hemiparasitic nature, habitat suitability may depend on the presence of certain host plant populations. This subspecies has been observed to occur in serpentinite soils in valley and foothill grassland habitats (a CDFG-designated sensitive habitat) from 197 to 1,312 feet in elevation. The yellow flowers are primarily bee-pollinated (USFWS 1998b). Associated species include dwarf plantain and purple needlegrass.

Tiburon paintbrush is a California endemic with fewer than 10 known occurrences in four USGS 7.5-minute quadrangles in Marin, Napa, and Santa Clara counties (CNPS 2011). This relatively limited distribution is consistent with the conclusions reached in the *Recovery Plan for Serpentine Soil Species of the San Francisco Bay Area* (USFWS 1998b), which states that the species historically was never widespread.

Two of the 10 known populations of Tiburon paintbrush are located in the Project Area, on southern Coyote Ridge, west of Anderson Reservoir. The largest population consists of approximately 1,000 individuals in the Kirby Canyon area of Coyote Ridge. Based on review of the specific environmental factors influencing the distribution of this species, including such items as elevation, soil type, slope, aspect, associate species, ecological condition, and proximity of documented populations to the current Project Area, habitat capable of supporting the Tiburon paintbrush likely also is present elsewhere in the Project Area. Suitable habitat includes serpentine bunchgrass grasslands, such as that elsewhere on Coyote Ridge as well as potentially in the Santa Teresa Hills. However, intensive surveys by SCVWD botanists of SCVWD canals on serpentine habitats in 2004 and 2008 did not detect this species, and there is a very low probability of its occurrence at Proposed Project work sites.

Coyote Ceanothus (*Ceanothus ferrisiae*). Federal Listing Status: Endangered; State Listing Status: None; CNPS List: 1B.1. Coyote ceanothus is an erect, stiffly branched evergreen shrub in the buckthorn family (*Rhamnaceae*) with small, dark green, shiny leaves. It blooms from January to May. This extremely rare species is distinguished from the common buckbrush (*Ceanothus cuneatus*) by the presence of short teeth along the margins of the leaves, tapered or rounded (not wedge-shaped) leaf bases, and wider seed capsules. The species has been observed to occur on serpentinite soils in chaparral, coastal scrub, and valley and foothill grasslands between 394 and 1,509 feet in elevation. Species commonly associated with Coyote ceanothus include foothill pine (*Pinus sabiniana*) and bigberry manzanita.

Four occurrences of Coyote ceanothus are in the Project Area. Three are located in the Anderson Dam and the Kirby Canyon area of southern Coyote Ridge, and the fourth is north of Morgan Hill near Llagas Avenue. According to the *Recovery Plan for Serpentine Soil Species of the San Francisco Bay Area* (USFWS 1998b), little or no reproduction has been observed in known stands of this species, and remaining populations are composed of mature and senescent individuals only. However, SCVWD botanist J. Hillman has observed that after a

fire on Pigeon Point above Anderson Dam in 2003, many thousands of individuals germinated and have established themselves.

Although the only known records of Coyote ceanothus from the Project Area are located in the Coyote Ridge/Anderson Reservoir areas and in Morgan Hill on the west side of the valley, complete surveys of suitable serpentine habitat in the Project Area have not been conducted. Similar serpentine soils as those that support the known populations likely occur in the Project Area in the Silver Creek area of northern Coyote Ridge and in the Santa Teresa Hills, and thus, serpentine bunchgrass grassland and mixed serpentine chaparral habitat in these areas also may support the species. However, intensive surveys by SCVWD botanists of SCVWD canals on serpentine habitats in 2004 and 2008 did not detect this species, and there is a very low probability of its occurrence at Proposed Project work sites.

Santa Clara Valley Dudleya (*Dudleya setchellii*). Federal Listing Status: Endangered; State Listing Status: None; CNPS List: 1B.1. Santa Clara Valley dudleya is a low-growing, succulent, perennial herb in the stonecrop family (*Crassulaceae*) that blooms during May and June, with a single plant often producing many flowering stems. Propagation occurs sexually via gravity/wind-dispersed seeds or vegetatively via rhizomes or horizontal stems. Individual plants may live more than 10 years. This dudleya is endemic to the ultramafic formations (serpentinite and peridotite) of the Santa Clara Valley, and is largely restricted to the serpentine areas surrounding Coyote Valley. Populations have been observed to occur on relatively barren rock outcrops and on serpentine balds within serpentine grasslands and cismontane woodlands from 197 to 1,493 feet in elevation. The species is characterized by a basal rosette of fleshy, glaucous leaves, which arise from a short, aboveground stem, and by ascending floral stems bearing pale yellow flowers. The roots of Santa Clara Valley dudleya can grow up to 12 inches long and typically extend into hairline fractures and rock crevices of serpentine outcrops. Associated species often include dwarf plantain, smooth lessingia (*Lessingia micradenia var. glabrata*), and both special-status jewel-flowers (*Streptanthus albidus* ssp*. albidus* and *S. albidus* ssp*. peramoenus*) (CNDDB 2011).

This Santa Clara County endemic is documented in seven USGS 7.5-minute quadrangles, all in the area from southern San Jose south to San Martin (USFWS 1998b, CNPS 2011). Numerous documented occurrences are in the Project Area. In 2000, H. T. Harvey & Associates (2000) conducted a county-wide assessment of the occurrence of Santa Clara Valley dudleya, and since then, additional occurrences have been identified by SCVWD staff (unpublished data) and others (CNDDB 2011). Numerous documented occurrences of Santa Clara Valley dudleya are in the Project Area. These are on rock outcrops in serpentine habitat near Chesbro and Calero reservoirs, in numerous locations along Coyote Ridge from the Silver Creek Hills south to the Kirby Canyon area, on Communications Hill, near Monterey Road/Senter Road, in the upper Llagas Creek watershed, and in the Santa Teresa Hills. During SCVWD's 2004 and 2008 surveys of SMP channels within serpentine soils, the species was documented along the Coyote Alamitos Canal (two populations totaling 41 plants in 2004 and one population of 1350 plants in 2008), the Almaden Calero Canal (one population of 75 plants in 2004 and 160 plants in 2008), and the Coyote Canal Extension (five populations totaling 791 plants in 2004 and six populations totaling 978 plants in 2008), within the SCVWD canal easement.

Serpentine soils similar to those that support the known populations occur in the Project Area throughout much of Coyote Ridge, on Tulare Hill, and in the Santa Teresa Hills, and thus, some potential exists that serpentine bunchgrass grassland and mixed serpentine chaparral habitat virtually anywhere in the Project Area may support the species.

Metcalf Canyon Jewel-flower (*Streptanthus albidus* ssp*. albidus*). Federal Listing Status: Endangered; State Listing Status: None; CNPS List: 1B.1. Metcalf Canyon jewel-flower is an annual herb in the mustard family (*Brassicaceae*) that blooms from April to July. It grows on serpentine soils in valley and foothill grassland habitat. It has been observed at elevations from 148 to 2,625 feet and can often be found on road cuts. Associated species include bird's foot lotus (*Lotus humistratus*), dwarf plantain, and Santa Clara Valley dudleya.

Metcalf Canyon jewel-flower is documented from seven USGS 7.5-minute quadrangles in Santa Clara County. The species can be locally abundant, but its range is extremely limited. It is known from fewer than 20 occurrences (CNPS 2011). Fourteen extant records of Metcalf Canyon jewel-flower are in Santa Clara County and in the Project Area (CNDDB 2011). The Consortium of California Herbaria (2011) lists seven records, all of which are from Santa Clara County, including records from the Silver Creek Hills of northern Coyote Ridge and from Communications Hill. Another large population is found on the southern boundary of the Project Area in Metcalf Canyon. During SCVWD's 2004 survey of SMP channels within serpentine habitat, one population (27 plants) of this species was documented along the Coyote Canal Extension, within the SCVWD canal easement. This population numbered 1088 plants during the 2008 survey. The species also has been reported west of Monterey Highway near Tulare Hill (CNDDB 2011), and it thus may occur along the Coyote Alamitos Canal as well. Only the closely related most beautiful jewel-flower, not Metcalf Canyon jewelflower, has been reported in the vicinity of the Almaden Calero Canal. Nevertheless, within the Project Area, serpentine bunchgrass grassland habitat along the length of Coyote Ridge, on Tulare Hill, in the Santa Teresa Hills, and in the San Vicente area west of Calero Reservoir (including areas along the Almaden Calero Canal) provide potential habitat for this species. Thus, some potential exists that it would occur in locations in or near Proposed Project work sites, where it has not been previously recorded.

California Native Plant Society-Listed Species

Franciscan Onion (*Allium peninsulare* var. *franciscanum*). Federal Listing Status: None; State Listing Status: None; CNPS List: 1B.2. Franciscan onion is a bulbiferous herb in the lily family (*Liliaceae*) that blooms from May to June. It often occurs on serpentinite soils or on clay or volcanic soils in cismontane woodland and valley and foothill grassland habitats at elevations from 171 to 984 feet (CNPS 2011). The CNDDB (2011) lists the species as occurring in mixed hardwood forest habitat with California bay, California buckeye, and coast live oak on volcanic substrates in shade to part sun among large cobbles.

Franciscan onion occurs in 10 USGS 7.5-minute quadrangles within Mendocino, Santa Clara, San Mateo, and Sonoma counties. No CNDDB records exist for this variety in the Project Area. The Consortium of California Herbaria (2011) lists two records of the variety in the mountains northwest of the Project Area, off Page Mill Road along its length to Black Mountain.

A known population is located along Page Mill Road from Palo Alto to the Los Altos Hills. It is possible that the species also is present elsewhere in the Project Area, as suitable habitat is present in the Santa Teresa and Almaden Hills, west of Calero Reservoir, east of Anderson Reservoir, near Llagas Creek, and within oak woodland habitats on clay soils and serpentine soils in the foothills of the Project Area.

Bent-flowered Fiddleneck (*Amsinckia lunaris*). Federal Listing Status: None; State Listing Status: None; CNPS List: 1B.2. Bent-flowered fiddleneck is an annual herb in the forget-me-not family (*Boraginaceae*) that blooms from March to June. This species has been observed to occur in cismontane woodland, coastal bluff scrub, and valley and foothill grassland habitat at elevations of 10 to 1,640 feet (CNPS 2011). The CNDDB (2011) describes the species as occurring in grassland habitat with encroaching scrub and associated species such as whitehead mule ears (*Wyethia helenioides*) and cream cups.

Bent-flowered fiddleneck occurs in Alameda, Contra Costa, Colusa, Lake, Marin, Napa, San Benito, Santa Clara, Santa Cruz, San Mateo, and Yolo counties. It is known from fewer than 35 occurrences in the North and Central Coast Ranges, many of which have not been observed in recent years (CNPS 2011). The CNDDB contains no records of bent-flowered fiddleneck within the Project Area, although one 1998 record exists, located approximately 1.1 miles north of Mt. Hamilton Road on Kinkaid Road above 1,000 feet in elevation.

Based on review of the specific environmental factors influencing the distribution of this species, portions of the Project Area likely contain habitat capable of supporting the bent-flowered fiddleneck. Suitable habitat is present below 1,000 feet elevation in chaparral and oak woodland habitats, particularly in the foothills of the Diablo Range.

Anderson's Manzanita (*Arctostaphylos andersonii*). Federal Listing Status: None; State Listing Status: None; CNPS List: 1B.2. Anderson's manzanita is an evergreen shrub in the heath family (*Ericaceae*) that blooms from November to April. It has been observed to occur in openings and along the edges of broadleafed upland forest, chaparral, and North Coast coniferous forest habitats at elevations of 197 to 2,395 feet. It may be confused with other species of manzanita merged with it as varieties.

Anderson's manzanita occurs in Santa Clara, Santa Cruz, and San Mateo counties. Eight documented populations in Santa Clara County occur above 1,000 feet in elevation, and are, therefore, outside of the Project Area. Potential habitat occurs in chaparral and forest openings at the upper edges of the Project Area, such as around Lexington Reservoir and Guadalupe Reservoir.

Brittlescale (*Atriplex depressa*). Federal Listing Status: None; State Listing Status: None; CNPS List: 1B.2. Brittlescale is an annual herb in the goosefoot family (*Chenopodiaceae*) that blooms from April to October. The species grows in relatively barren areas with alkaline clay soils within chenopod scrub, meadows and seeps, playas, vernal pools, valley and foothill grassland, and occasionally in riparian marshes (CNPS 2011). It has been observed to occur at elevations from 3 to 1,050 feet (CNPS 2011). Atriplex species are somewhat tolerant of disturbance. Associate species include alkaline-adapted, seasonal wetland species such as bush seepweed (*Suaeda moquinii*), common tarweed (*Centromadia pungens*), and more common alkaline tolerant grasses such as Italian wild-rye.

Brittlescale occurs in the Warm Springs Area of Fremont in Alameda County, approximately 1.5 miles north of the Project Area, in alkaline depressional habitats very similar to those found in the lands immediately south of the San Jose/Santa Clara Water Pollution Control Plant (WPCP) in Alviso, as well as in Arzino Ranch to the southwest of the WPCP. As suitable habitat is present in the Project Area and nearby populations may provide a potential seed source, the species may occur in the Project Area near Alviso in alkaline seasonal wetlands south and southwest of the WPCP.

Big-scale Balsamroot (*Balsamorhiza macrolepis* var*. macrolepis*). Federal Listing Status: None; State Listing Status: None; CNPS List: 1B.2. Big-scale balsamroot is a perennial herb belonging to the sunflower family (*Asteraceae*) that blooms from March to June. This plant has been observed to occur in chaparral, cismontane woodland, and valley and foothill grasslands, sometimes on serpentine, at elevations between 295 and 4,593 feet (Hickman 1993, CNPS 2011). CNDDB (2011) describes the species as occurring locally on serpentine substrate in California annual grassland habitat on northwest facing slopes of 50 percent. Associated species include phacelia (*Phacelia* spp.), California beeplant, and Ithuriel's spear (*Triteleia laxa*).

Big-scale balsamroot is reported from Alameda, Butte, Colusa, El Dorado, Lake, Mariposa, Napa, Placer, Santa Clara, Solano, Sonoma, and Tehama counties (CNPS 2011). One record exists of big-scale balsamroot in the Project Area, 0.85 mile southeast of the Capitol Expressway and Highway 101 interchange, but it has been extirpated because of development (CNDDB 2011). Another record, believed to be extant, occurs at the north end of the Silver Creek Hills adjacent to development.

Many of the key habitat characteristics believed to be responsible for influencing the distribution of this species are present elsewhere in the Project Area as well. Suitable habitat includes serpentine bunchgrass grassland, mixed serpentine chaparral, and oak woodland habitat types on Coyote Ridge, the Santa Teresa Hills, Communications Hill, near the Anderson Reservoir, and near Alum Rock. However, SCVWD surveys for special-status plants along all creeks and canals mapped on serpentine soils in 2004 and 2008 did not detect any occurrences of big-scale balsamroot. Therefore, this species is not expected to occur in or very near any Proposed Project work sites.

Round-leaved Filaree (*Erodium macrophyllum*). Federal Listing Status: None; State Listing Status: None; CNPS List: 1B.1. Round-leaved filaree is an annual herb in the geranium family (*Geraniaceae*) that blooms from March to May. This species has been observed to occur on clay soils in valley and foothill grassland, and open cismontane woodland habitats at elevations from 49 to 3,937 feet.

Round-leaved filaree occurs in 92 USGS 7.5-minute quadrangles in Alameda, Contra Costa, Colusa, Fresno, Glenn, Kings, Kern, Lake, Lassen, Los Angeles, Merced, Monterey, Napa, Riverside, Santa Barbara, San Benito, Santa Clara, San Diego, San Joaquin, San Luis Obispo, San Mateo, Solano, Sonoma, Stanislaus, Tehama, Ventura, and Yolo counties, and in habitats from Oregon to Baja California. Many collections of the species are historical (CNPS 2011).

One historical record (1955) of round-leaved filaree is listed in the CNDDB (2011) as occurring in the Project Area in the Silver Creek Hills. Additional suitable habitat for the species occurs on clay soils in California annual grassland and oak woodland habitats such as those in the Santa Teresa and Almaden Hills.

Pink Creamsacs (*Castilleja rubicundula* ssp*. rubicundula*). Federal Listing Status: None; State Listing Status: None; CNPS List: 1B.2. Pink creamsacs is an annual herb in the figwort family (*Scrophulariaceae*) that blooms from April to June. This subspecies grows on serpentinite soils in openings in chaparral, cismontane woodland, meadows and seeps, and valley and foothill grassland habitats. It has been observed to occur from 66 to 2,953 feet in elevation.

This California endemic occurs in 20 USGS 7.5-minute quadrangles in Butte, Colusa, Glenn, Lake, Napa, Santa Clara, and Shasta counties (CNPS 2011). One CNDDB record exists of pink creamsacs occurring in the Project Area, north of Tar Creek approximately 5.4 miles south of Gilroy within the Santa Cruz Mountains.

Based on review of the specific environmental factors influencing the distribution of this species, habitat capable of supporting pink creamsacs likely is present elsewhere in the Project Area as well. Suitable habitat is present on serpentinite-derived soils, such as those on Coyote Ridge, within the Santa Teresa Hills, on Communications Hill, and near Alum Rock. Because not all of the serpentine soils have been mapped in the county, suitable habitat also could be found in portions of the eastern foothills of the Project Area. However, SCVWD surveys for special-status plants along all creeks and canals mapped on serpentine soils in 2004 and 2008 did not detect any occurrences of pink creamsacs. Therefore, this species is not expected to occur in or very near any Proposed Project work sites.

Congdon's Tarplant (*Hemizonia parryi* ssp*. congdonii*). Federal Listing Status: None; State Listing Status: None; CNPS List: 1B.2. Congdon's tarplant is an annual herb in the composite family (*Asteraceae*) that has a variable blooming period extending from June through November. It occurs in valley and foothill grasslands, particularly those with alkaline substrates, and in slumps or disturbed areas where water collects in lower elevation wetlands below approximately 760 feet. The subspecies tolerates disturbance and often occurs in disked fields with non-native, California annual grassland habitat with Harding grass (*Phalaris paradoxa*) and alkali mallow (*Malvella leprosa*).

Congdon's tarplant occurs in Alameda, Contra Costa, San Mateo, Monterey, San Luis Obispo, and Santa Clara counties, and it is presumed extirpated from its historical range in Solano and Santa Cruz counties (CNPS 2011). Several records of Congdon's tarplant are listed in the CNDDB (2011) as occurring near or in the Project Area. A population identified in 2002 is in Sunnyvale Baylands Park northeast of the junction of SR 237 and the Lawrence Expressway in Sunnyvale. Another population occurs in the Project Area near Alviso, located north of SR 237 and east of North 1st Street in a field bounded by Grand Avenue, Wilson Way, Nortech Parkway, and Disk Drive (LSA Associates 1999). One historical reference is found from the Project Area in eastern San Jose, observed in 1908, but the habitat in that location no longer exists. In addition, the species has recently been detected at Mission College in Santa Clara (West Valley – Mission Community College District 2009). A population is located approximately 1.5 miles northeast of the Project Area in the Warm Springs District of Fremont in Alameda County.

Aside from the recent record near Alviso, the species may be present in other locations where suitable habitat exists in the Project Area. This would be in disturbed California annual grassland habitat (with alkaline substrates), particularly near seasonal wetland, brackish marsh, and muted tidal marsh habitat in the northern portion of the Project Area.

Mt. Hamilton Thistle (*Cirsium fontinale* var*. campylon*). Federal Listing Status: Species of Concern; State Listing Status: None; CNPS List: 1B.2. Mt. Hamilton thistle is an erect, pale green, wooly perennial plant in the sunflower family (*Asteraceae*) that blooms from April to October, producing nodding white to pinkish flowering heads with spiny, reflexed flower bracts. Mt. Hamilton thistle is associated with seeps and streams, within chaparral, cismontane woodland, and valley and foothill grassland habitats on serpentine soils from 328 to 2,920 feet elevation. Some special-status plants that may occur near Mt. Hamilton thistle on similar soils, although not in moist areas, include the Santa Clara Valley dudleya and the Metcalf Canyon jewel-flower. Mt. Hamilton thistle occurs in stands of a few plants to several thousand plants, almost always in seasonal or perennial wetlands.

The range of Mt. Hamilton thistle includes 10 USGS 7.5-minute quadrangles in Santa Clara, Alameda, and Stanislaus counties. Twenty-five records are in the Project Area. Clusters of populations occur in the serpentine seeps and swales along the eastern and southwestern foothills of the Project Area. It is found in the Calero/Almaden Canal, Coyote Canal, Coyote Canal Extension, Silver Creek, Metcalf Canyon, Anderson Dam spillway, Coyote Creek tributaries, springs east of Coyote Creek, drainages between Kirby Canyon landfill, and Coyote Creek golf course, drainage near Almaden Research Center, north Calero Reservoir in a tributary to Arroyo Creek, and others. The species was detected on the Almaden Calero Canal and the Coyote Canal during SCVWD's 2004 survey and on the Coyote Canal and

Coyote Canal Extension in 2008. Suitable habitat elsewhere in the Project Area includes mesic serpentine habitats such as seeps and swales. Known serpentine habitat occurs elsewhere on Coyote Ridge and in the Santa Teresa Hills as well.

Santa Clara Red Ribbons (*Clarkia concinna* ssp*. automixa*). Federal Listing Status: None; State Listing Status: None; CNPS List: 4.3. Santa Clara red ribbons is an annual herb in the evening-primrose family (*Onagraceae*) that blooms from May to June, and rarely as early as April or as late as July, depending on the microsite and annual climactic conditions. This species occurs in chaparral and cismontane woodland habitats in San Francisco Bay Area foothills at an elevational range of approximately 295 to 4,950 feet (CNPS 2011). The species has been observed growing on steep, rocky slopes surrounded by mixed evergreen forest near drainages. Commonly associated species include white fairy lantern (*Calochortus albus*) and yellow stonecrop (*Sedum spathulifolium*).

This species has a very small endemic range and is known to occur only in Alameda and Santa Clara counties (CNPS 2011), although older records exist from surrounding counties such as Santa Cruz, and herbarium records indicate some populations occurring in the northern Coast Ranges (Consortium of California Herbaria 2010). Seventeen records of Santa Clara red ribbons are listed in Santa Clara County. The majority of these occurrences are above the 1,000 feet elevation contour. Three records are below 1,000 feet in elevation and within the Project Area. One was mapped just east of Alum Rock in 1922, and another was mapped in 1907 at Alma Soda Spring West of Lexington Reservoir. The third record was from 1985 near Stevens Creek Road and Redwood Gulch Road, west of Saratoga. Suitable chaparral and oak woodland habitat occurs elsewhere in the Project Area along slopes and drainages at higher elevations in the Diablo Range and Santa Cruz Mountains.

San Francisco Collinsia (*Collinsia multicolor*). Federal Listing Status: None; State Listing Status: None; CNPS List: 1B.2. San Francisco collinsia is an annual herb in the figwort family (*Scrophulariaceae*) that blooms from March to May (CNPS 2011). It has been observed to occur on serpentine soils in closed-cone coniferous forest and coastal scrub habitats at elevations from 98 to 820 feet. The CNDDB (2011) states that the species occurs in coastal scrub habitat on decomposed shale/mudstone mixed with humus in closed-cone coniferous forest habitat near coast live oak woodland habitat. Associated species include plectritis (*Plectritis spp*.), woodland star (*Lithophragma sp*p.), fringe pod (*Thysanocarpus spp*.), and shooting star (*Dodecatheon hendersonii*). The San Francisco collinsia is considered a covered species by the draft Habitat Plan (ICF Jones & Stokes 2010).

San Francisco collinsia is documented from 10 USGS 7.5-minute quadrangles in Monterey, Santa Clara, Santa Cruz, San Francisco, and San Mateo counties. There is one confirmed extant occurrence in Santa Clara County—a new population of the species was identified by SCVWD botanist J. Hillman in 2009 near the shoreline of Anderson Reservoir. Two older occurrences exist that are possibly not extant (Edenvale and Almaden Quicksilver). The Edenvale area is currently developed, and this occurrence may be extirpated, but focused surveys around Edenvale are planned for 2011 to verify the existence of this occurrence (J. Hillman pers comm.). SCVWD surveys for special-status plants along all creeks and canals mapped on serpentine soils in the Project Area in 2004 and 2008 did not detect any occurrences of San Francisco collinsia. However, the majority of occurrences are not located

on serpentine soils. Thus, some potential exists for the species to occur in or near Proposed Project work sites, either on serpentine or non-serpentine soils.

Hospital Canyon Larkspur (*Delphinium californicum* ssp*. interius*). Federal Listing Status: None; State Listing Status: None; CNPS List: 1B.2. Hospital Canyon larkspur inhabits a small endemic range covering the mid- and upper elevations of the inner Coast Ranges along the San Francisco Bay Area and south towards Mount Hamilton. Records exist from Alameda, Contra Costa, Merced, San Benito, Santa Clara, San Joaquin, and Stanislaus counties (CNPS 2011). The species is found in chaparral and cismontane woodland habitats at elevations of approximately 760 to 3,615 feet. CNDDB records indicate that microhabitat conditions for the species are wet, boggy meadows, openings in chaparral, and canyons. Hospital Canyon larkspur is a perennial herb in the buttercup (*Ranunculaceae*) family and blooms from April to June.

Hospital Canyon larkspur inhabits a small endemic range covering the mid-and upper elevations of the inner Coast Ranges along the San Francisco Bay Area and south towards Mount Hamilton. It is found in seven counties within this range, including Santa Clara. The CNDDB (2011) documents three occurrences in Santa Clara County over 1,000 feet in elevation, outside of the Project Area. However, potential habitat exists in the Project Area in canyons, openings in chaparral, and wet boggy meadows, in the foothills of the Diablo Range above 760 feet in elevation, and the species potentially can occur in the Project Area.

Western Leatherwood (*Dirca occidentalis*). Federal Listing Status: None; State Listing Status: None; CNPS List: 1B.2. Western leatherwood is a deciduous shrub in the mezereum family (*Thymelaeaceae*) that blooms from January to April, and sometimes as late as May. It is endemic to California, and is the only species in its family found in the state. This shrub has been observed to occur in mesic broadleafed upland forest, closed-cone coniferous forest, chaparral, cismontane woodland, North Coast coniferous forest, riparian forest, and riparian woodland habitats from 164 to 1,296 feet in elevation. Road maintenance may affect the species; however, populations also generally are declining because of low reproductive rates (CNPS 2011).

Western leatherwood has been documented in 19 USGS 7.5-minute quadrangles in Santa Clara, Alameda, Contra Costa, Marin, San Mateo, and Sonoma counties. Santa Clara County is at the southern edge of its range. Four documented populations are in the Project Area, primarily located in the northwestern corner of the county in the foothills near Palo Alto, including Los Trancos Creek, Palo Alto Foothills Park, and Permanente Creek near Mountain View. Beyond these documented occurrences, other potential habitat occurs in the foothills of the Santa Cruz Mountains in mesic sites, or brushy slopes in mixed evergreen and foothill woodland communities north of Highway 17.

Hoover's Button Celery (*Eryngium aristulatum* var*. hooveri*) Federal Listing Status: None; State Listing Status: None; CNPS List: 1B.1. Hoover's button celery is an annual or perennial herb in the umbellifer (*Apiaceae*) family that blooms in July. It has been observed to occur in vernal pool habitats from 10 to 148 feet in elevation. This California endemic is documented in nine USGS 7.5-minute quadrangles in Alameda, San Benito, Santa Clara, San Diego, and San Luis Obispo counties (CNPS 2011). Associate species include calicoflower (*Downingia* spp.), woolly marbles (*Psilocarphus* spp.), and popcorn flower (*Plagiobothrys* spp.).

Six historical records of Hoover's button celery are in the Project Area. Five of these are thought to have been extirpated by development. Many of these historical occurrences (from 1902) were located in roadside ditches in the Project Area west of Alviso or in nearby baylands. One extant occurrence is located in the vicinity of San Felipe Lake near the southeastern border of the County. Another extant population occurs just north of the Project Area in the Warm Springs Area in Alameda County, in a disturbed alkaline wetland habitat very similar to those found southwest of the WPCP. Therefore, because suitable habitat occurs in the Project Area and nearby populations may provide a potential seed source, this species may still occur in alkaline-influenced or clayey depressional wetlands or possibly even agricultural ditches in the northern reaches of the Project Area near Alviso.

Fragrant Fritillary (*Fritillaria liliacea*). Federal Listing Status: None; State Listing Status: None; CNPS List: 1B.2. Fragrant fritillary is a bulbiferous herb in the lily family (*Liliaceae*) that blooms from February through April. It has been observed to occur in cismontane woodland, coastal prairie, coastal scrub, and valley and foothill grassland habitats, often on areas with serpentine substrates at elevations of 10 to 1,345 feet (CNPS 2011). The fragrant fritillary prefers relatively open grassland habitats underlain with heavy clay soils derived from serpentine bedrock in Santa Clara County. Some commonly associated species are purple needlegrass, pine bluegrass (*Poa scabrella*), Santa Clara Valley dudleya, and Metcalf Canyon jewel-flower.

The species' range extends through Santa Clara, Alameda, Contra Costa, Monterey, Marin, San Benito, San Francisco, San Mateo, Solano, and Sonoma counties. Six records of fragrant fritillary are listed in the CNDDB (2011) as occurring within the Project Area. These are typically located on serpentine soils near the town of Evergreen in the Silver Creek Hills, north of Alum Rock, Metcalfe Canyon, Calero County Park, and Almaden/Quicksilver Park. Potential habitat in the Project Area includes serpentine or clay soils with bunchgrass grassland habitat and oak woodland habitat, such as those in the Silver Creek area; Santa Teresa Hills;; near Calero, Chesbro, and Anderson Reservoirs;; and on Communications Hill. However, SCVWD surveys for special-status plants along all creeks and canals mapped on serpentine soils in 2004 and 2008 did not detect any occurrences of fragrant fritillary. Therefore, this species is not expected to occur in or very near any Proposed Project work sites.

Loma Prieta Hoita (*Hoita strobilina*). Federal Listing Status: None; State Listing Status: None; CNPS List: 1B.1. Loma Prieta hoita is a perennial herb in the legume family (*Fabaceae*) that blooms from May to October. It typically grows in mesic areas with serpentinite features in chaparral, cismontane woodlands, and riparian woodlands at elevations between 98 and 2,822 feet (CNPS 2011). Commonly associated trees and shrubs include big leaf maple, mountain mahogany (*Cercocarpus betuloides*), and California foothill pine. Some special-status plants also associated with Loma Prieta hoita include Mt. Hamilton thistle, smooth lessingia, and robust monardella (*Monardella villosa ssp. globosa*). It often occurs in the understory of coast live oak woodland and forest.

Loma Prieta hoita occurs in 12 USGS 7.5-minute quadrangles in Santa Clara, Contra Costa, and Santa Cruz counties, and is believed to be extirpated from Alameda County. Thirteen recorded occurrences of Loma Prieta Hoita are in the Project Area, found primarily in the Santa Cruz Mountains from Saratoga to Gilroy although it also occurs in the Diablo Range near Coyote Ridge. Suitable habitat for the species occurs in mesic, serpentine-influenced areas of coast live oak woodland and forest habitat, including riparian areas, in the Project Area, such as the Santa Teresa Hills and along Coyote Ridge. This species is known to occur along several streams in Santa Clara County, and it could potentially occur in Proposed Project work sites as well.

Satan's Goldenbush (*Isocoma menziesii* var*. diabólica*). Federal Listing Status: None; State Listing Status: None; CNPS List: 4.2. Satan's goldenbush is a California endemic, perennial shrub in the sunflower family (*Asteraceae*) that blooms from August to October. This variety has been observed to occur in cismontane woodland habitats, specifically open slopes and cliffs in foothill woodland habitat, from 49 to 1,312 feet in elevation. Associated species include naked buckwheat, yerba santa, and shrub live oak (*Quercus turbinella*) (Corelli and Chandik 1996).

Satan's goldenbush is a CNPS list 4.2 species included for analysis based on its limited geographic range. It is a documented only in Santa Clara and San Benito counties (CNPS 2011). The Consortium of California Herbaria (2011) lists three occurrences in Santa Clara County, all in Milpitas. Habitats known to support this species share many characteristics with some of the relatively undisturbed habitats in the Project Area. Suitable habitat includes oak woodlands, such as those in the Santa Teresa Hills, the Almaden Hills, and on Coyote Ridge.

Woolly-headed Lessingia (*Lessingia hololeuca*). Federal Listing Status: None; State Listing Status: None; CNPS List: 3. Woolly-headed lessingia is an annual herb in the sunflower family (*Asteraceae*) that blooms from June to October. This species has been observed to occur in clay and serpentinite soils in broadleafed upland forest, coastal scrub, lower montane coniferous forest, and valley and foothill grassland habitats from 49 to 1,000 feet.

Wooly-headed lessingia is a California endemic that is documented in 27 USGS 7.5-minute quadrangles in Alameda, Monterey, Marin, Napa, Santa Clara, San Mateo, Solano, Sonoma, and Yolo counties. The species is under consideration to be moved to CNPS List 4, but more study is needed to verify its range (CNPS 2011). Grazing may threaten the species (CNPS 2011).

The Consortium of California Herbaria (2011) has three documented occurrences of wooly-headed lessingia in Santa Clara County, located in the foothills around Los Gatos, and near Gilroy. Suitable habitat is present in the Project Area on serpentine and clay soils in the foothills of both the Santa Cruz Mountains and the Diablo Range. However, SCVWD surveys for special-status plants along all creeks and canals mapped on serpentine soils in 2004 and 2008 did not detect any occurrences of wooly-headed lessingia. Therefore, this species is not expected to occur in or very near any Proposed Project work sites.

Smooth Lessingia (*Lessingia micradenia* var*. glabrata*). Federal Listing Status: Species of Concern; State Listing Status: None; CNPS List: 1B.2. Smooth lessingia is an erect annual herb in the sunflower family (*Asteraceae*). This species is a delicate, many-branched plant with thread-like leaves along the stem and small, white-to-lavender flowers that bloom from July through November. Smooth lessingia has been observed to occur in areas approximately 400 to 1,400 feet in elevation and it is endemic to serpentine outcrops in Santa Clara County. Most populations are associated with open oak woodland and chaparral, and it is sometimes found on roadsides and growing in SCVWD access roads adjacent to canals. On Coyote Ridge, however, populations are found in both serpentine grassland and various shrub associations, as well as on the edges of wetlands (CNPS 2011). Commonly associated species include big berry manzanita, California sagebrush, and toyon. Santa Clara Valley dudleya and the most beautiful jewel-flower (*Streptanthus albidus ssp. peramoenus*) also are known to occur with smooth lessingia.

Twenty-seven documented occurrences of smooth lessingia are in the Project Area (CNDDB 2011, CNPS 2011. These are scattered throughout the central and southern foothills of the Santa Cruz Mountains and the Diablo Range in Santa Clara County. Most of these occurrences are on slopes with serpentine soils such as the Santa Teresa Hills and south along Coyote Ridge, Llagas Creek, Almaden Reservoir and Almaden Quicksilver County Park, Chesbro Reservoir, Anderson Reservoir, and Calero Reservoir. Smooth lessingia also was observed on the Almaden Calero Canal, Coyote Alamitos Canal, Coyote Canal, and Coyote Canal Extension during SCVWD's 2004 and 2008 surveys. Additionally, suitable serpentine rock outcrop habitat occurs on roadsides and rocky slopes throughout these locations and the south central foothills of the Project Area.

Showy Golden Madia (*Madia radiata*). Federal Listing Status: None; State Listing Status: Rare; CNPS List: 1B.1. Showy golden madia is an annual herb in the sunflower family (*Asteraceae*) that blooms from March to May. This species has been observed to occur in cismontane woodland and valley and foothill grassland habitats from 82 to 2,953 feet in elevation. The historical range of this California endemic includes 34 USGS 7.5-minute quadrangles in Contra Costa, Fresno, Kings, Kern, Monterey, Santa Barbaram San Benito, San Joaquin, San Luis Obispo, and Stanislaus counties. It now only occurs in 20 USGS 7.5-minute quadrangles in Fresno, Kern, San Benito, San Luis Obispo, and Stanislaus counties. Grazing and non-native plants threaten the species (CNPS 2011).

One documented occurrence of showy golden madia is in Santa Clara County above 1,000 feet in elevation, outside the Project Area. However, potential habitat exists in the foothills of both the Santa Cruz Mountains and the Diablo Range particularly on adobe clay soils, and the species potentially can occur in the Project Area.

Davidson's Bush-mallow (*Malacothamnus davidsonii*). Federal Listing Status: None; State Listing Status: None; CNPS List: 1B.2. Davidson's bush mallow is a deciduous shrub in the mallow family (*Malvaceae*) that blooms from June to January. This species typically occurs on sandy washes and flats in coastal scrub, cismontane woodland, riparian woodland, and chaparral communities (CNPS 2011), and it is generally associated with disturbance (Hickman 1993). Associated species include California sagebrush, sticky snakeroot (*Ageratina adenophora*), and mulefat.

Davidson's bush mallow occurs in disjunct populations in 21 USGS 7.5-minute quadrangles in Santa Clara, Los Angeles, Monterey, San Luis Obispo, and San Mateo counties at elevations of 600 to 2,800 feet (CNPS 2011). No records of the species in the Project Area are listed in the CNDDB (2011). The Consortium of California Herbaria (2011) lists three records of the species collected from Santa Clara County in Los Altos and near Stanford. The record near Stanford, though, was previously thought to be arcuate bush mallow. Even though this species has not been reported as occurring in the Project Area, based on a review of the specific environmental factors influencing the distribution of this species, habitat capable of supporting the bush mallow likely occurs in the Project Area. Suitable habitat exists within chaparral, riparian, and oak woodland habitat in the Project Area in sandy washes and flats of streams and dams draining the foothills of the Santa Cruz Mountains and Diablo Range.

Hall's Bush-mallow (*Malacothamnus hallii*). Federal Listing Status: None; State Listing Status: None; CNPS List: 1B.2. Hall's bush-mallow is an evergreen shrub in the mallow family (*Malvaceae*) that blooms from May to September, and sometimes in October. This shrub has been observed to occur in chaparral and coastal scrub habitats from 33 to 2,493 feet in elevation. It is primarily found in mixed northern chaparral and chamise chaparral in grassy openings. Germination is fire-dependent. Associated species include chamise, California sagebrush, sticky monkey-flower and purple needlegrass.

Hall's bush-mallow is a California endemic documented in 19 USGS 7.5-minute quadrangles in Santa Clara, Contra Costa, Mendocino, Merced, San Mateo, and Stanislaus counties. Twenty records of Hall's bush-mallow from Santa Clara County are listed in the CNDDB (2011), 15 of these are in the Project Area, under 1,000 feet in elevation. Most occurrences are within the Santa Teresa Hills, Coyote Ridge, Anderson Dam County Park, near Almaden Reservoir, near Calero Reservoir and at the Santa Teresa County Park. Four populations totaling 55 individuals of Hall's bush-mallow were observed on the Coyote Canal Extension during SCVWD's 2004 and 2008 botanical surveys. Additionally, potential chaparral habitat for Hall's bush-mallow in the Project Area may occur in the foothills of the Santa Cruz Mountains and the Diablo Range.

Oregon Meconella (*Meconella oregana*). Federal Listing Status: None; State Listing Status: None; CNPS List: 1B.1. Oregon meconella is an annual herb in the poppy family (*Papaveraceae*) that blooms from March to April. This plant has been observed to occur in coastal prairie and coastal scrub communities at elevations between 820 and 2,034 feet

(CNPS 2011). Oregon meconella is known to occur in Contra Costa and Santa Clara counties in California, as well as Oregon and Washington. The species is known in California from only five occurrences, which are threatened by alteration of fire regimes (CNPS 2011).

One 2005 occurrence of Oregon meconella within Santa Clara County is at 2,100 feet elevation, outside of the Project Area. This is located near the summit of Mt. Hamilton in open-moist habitat. Potential habitat occurs toward the upper elevations of the Project Area in the Diablo Range.

Mount Diablo Cottonweed (*Micropus amphibolus*). Federal Listing Status: None; State Listing Status: None; CNPS List: 3.2. Mount Diablo cottonweed is an annual member of the sunflower family (*Asteraceae*) that blooms from March through May. It occurs on bare, grassy, or rocky slopes in broadleaved upland forest, chaparral, cismontane woodland, and valley and foothill grassland (Hickman 1993, CNPS 2011). It is found over a wide elevation range, with populations recorded from approximately 145 to 2,725 feet.

The range of Mount Diablo cottonweed includes Santa Clara, Alameda, Contra Costa, Colusa, Lake, Monterey, Marin, Napa, Santa Barbara, Santa Cruz, Solano, and Sonoma counties. The Consortium of California Herbaria (2011) lists one record of the species collected in Santa Clara County near Mayfield, west of Campbell in the Project Area. Despite the lack of records for this species, after consideration of the species habitat preferences and environmental conditions present on several habitats in the Project Area, suitable habitat for the species likely occurs. Areas of potential occurrence include chaparral, California annual grassland, and oak woodland habitats within the foothills of the Diablo Range and the Santa Cruz Mountains.

Robust Monardella (*Monardella villosa* ssp*. globosa*). Federal Listing Status: None; State Listing Status: None; CNPS List: 1B.2. Robust monardella is a perennial, rhizomatous herb in the mint family (*Lamiaceae*) that blooms from June through July, and sometimes into August. It occurs in openings in broadleaf upland forests and chaparral, open oak woodlands, coastal scrub, and valley and foothill grasslands, and is found at mid elevations from approximately 330 to 3,020 feet. Associated species include California buckeye, California sagebrush, toyon, and various oaks, including coast live oak.

Robust monardella's range includes Santa Clara, Alameda, Contra Costa, Humboldt, Lake, Mendocino, Napa, Santa Cruz, San Mateo, and Sonoma counties (CNPS 2011). Ten records of robust monardella are listed in the CNDDB (2011) as occurring in Santa Clara County. Of these, five are below the 1,000-foot elevation contour and within the Project Area. These are located around the Almaden Quicksilver Park, near Lexington Reservoir, and the Rancho San Antonio Open Space Preserve. Based on review of specific environmental factors influencing the distribution of this species, other habitat capable of supporting robust monardella likely occurs in the Project Area. Suitable habitat includes chaparral, oak woodland, and California annual grassland habitats in the foothills of the Santa Cruz Mountains and the Diablo Range.

Hooked Popcorn-flower (*Plagiobothrys uncinatus*). Federal Listing Status: None; State Listing Status: None; CNPS List: 1B.2. Hooked popcorn-flower is an annual herb in the borage family (*Boraginaceae*) that can bloom from April to May (CNPS 2011). This

California endemic occurs in valley and foothill grasslands, cismontane woodlands, and chaparral habitats at elevations of approximately 990 to 2,510 feet. In chaparral, hooked popcorn-flower requires sandy soils; and across all habitat types, it is often associated with canyon slopes (Hickman 1993, CNPS 2011). It is found in 18 USGS 7.5-minute quadrangles in Monterey, San Benito, Santa Clara, San Luis Obispo, and Stanislaus counties. However, more study is required in the Gabilan and Santa Lucia ranges to determine the true rarity and endangerment status of this species (CNPS 2011).

In Santa Clara County, two historically documented populations from 1935 and 1963 are considered extant. These populations are both documented at elevations over 1,000 feet, and are found near Mt. Hamilton in the Diablo Range. Because the lower limit of hooked popcorn flower's elevation range is 990 feet, the likelihood of its occurrence in the Project Area is very low, and it potentially occurs only toward the edge of the Project Area in the upper foothills of the Diablo Range.

Most Beautiful Jewel-flower (*Streptanthus albidus ssp. peramoenus*). Federal Listing Status: None; State Listing Status: None; CNPS List: 1B.2. Most beautiful jewel-flower is an annual herb in the mustard family (*Brassicaceae*) that can bloom from March to October, but usually blooms between April and September. This subspecies is indigenous to thin, rocky serpentine (Montara series) soils and serpentinite rock outcrops. Its germination and growth is greatly enhanced by disturbances such as wildfire and exposure of bare soil/bedrock resulting from road cuts. It occurs in chaparral, cismontane woodland, and valley and foothill grassland habitats at elevations from approximately 308 to 3,281 feet. It has been found along road cuts and in access roads along SCVWD's canal system. Associated species include purple needlegrass and dwarf plantain. This subspecies also occurs with the Santa Clara Valley dudleya and smooth lessingia.

The known range of this California endemic is restricted to 29 USGS 7.5-minute quadrangles in Alameda, Contra Costa, Monterey, Santa Clara, and San Luis Obispo, and Santa Barbara counties. The taxonomic status of the species is under debate (USFWS 1998b). The range of the species is disjunct, with one range centered at the inner coast along San Francisco Bay, and the other in the outer coast in San Luis Obispo and Santa Barbara counties. Further project work is needed to determine if the southern range represents a different species, which would indicate that the northern variety has a more tightly restricted, endemic range than previously thought (CNPS 2011).

Twenty-six records of most beautiful jewel-flower are listed in the CNDDB (2011) as occurring in the Project Area. Most of these occurrences are scattered within the Almaden Quicksilver County Park, around Coyote Peak and the Calero Reservoir, and in the Santa Teresa Hills. Records also exist from the northwest flank of Tulare Hill, along Silver Creek Road, and along Coyote Ridge west of Anderson Reservoir to Kirby Canyon. The Consortium of California Herbaria (Consortium of California Herbaria 2010) lists seven specimens of the species collected from Santa Clara County in the Santa Teresa Hills, by the Lexington Reservoir, and near Morgan Hill. Most beautiful jewel-flower was observed on the Almaden Calero Canal and Coyote Canal during SCVWD's 2004 and 2008 botanical surveys. Suitable habitat exists for the species in serpentine soils throughout the foothills of the Project Area.

Saline Clover (*Trifolium depauperatum* var*. hydrophilum*). Federal Listing Status: None; State Listing Status: None; CNPS List: 1B.2. Saline clover is an annual herb in the legume family (Fabaceae) that has been observed to occur in mesic, alkaline, or saline sites in valley and foothill grassland habitat, in vernal pool habitat, or in marshes and swamps at elevations from 0 to 984 feet. Hickman (1993) specifically indicates that the species occurs in coastal salt marshes as well as inland marshes. The blooming period extends from April through June, although in salt marshes the species may flower slightly later than seen in alkaline grassland areas. The range of this species has been reduced to remaining alkaline grasslands in Alameda, Colusa, San Mateo, Monterey, Napa, San Luis Obispo, San Benito, Santa Clara, Solano, Sonoma, and Santa Cruz counties. The species is documented from 22 USGS 7.5-minute quadrangles. Many occurrences of the species have likely been extirpated; the species is threatened by development, trampling, road construction, and vehicles (CNPS 2011).

One recorded occurrence is near the southern border of the County between Millers Canal and the Pajaro River. This species may occur in the Project Area in alkaline, mesic soils such as vernal pools, marshes and swamps, or grasslands, and it could possibly occur either near the Pajaro River or in the Alviso area.

Appendix I
DETAILED DESCRIPTIONS OF SPECIAL-STATUS WILDLIFE SPECIES POTENTIALLY OCCURRING IN THE PROJECT AREA

Federal or State Endangered and Threatened Species

Bay Checkerspot Butterfly (*Euphydryas editha bayensis*). Federal Listing Status: Threatened; State Listing Status: None. The life cycle of the Bay checkerspot butterfly is closely tied to the biology of its primary larval host plant, the dwarf plantain. Secondary host plants, purple owl's-clover and exserted paintbrush (*Castilleja exserta*), also are important sources of food for both larvae and adults (Black and Vaughn 2005). Populations of the Bay checkerspot butterfly are restricted to areas with shallow serpentine-derived or similar soils that have substantial populations of dwarf plantain, which are highly fragmented and isolated (USFWS 2008a).

The Bay checkerspot butterfly formerly ranged around San Francisco Bay, from Twin Peaks and San Bruno Mountain in San Francisco east to Contra Costa County, and south to Santa Clara County (USFWS 1998b). However, the current known range has been reduced to Santa Clara County, where patches of the species' habitat are still present (USFWS 2008a), and to San Mateo County, where it was extirpated but where reintroduction has recently been attempted. The Bay checkerspot butterfly was listed as threatened in September 1987 (USFWS 1987), and critical habitat was finalized in September 2008 (USFWS 2008a). Nine of this species' critical habitat units occur within or adjacent to the Project Area.

The distribution of the Bay checkerspot butterfly in and near the Project Area is fairly well represented by critical habitat, which was designated for the species by the USFWS in 2008 (USFWS 2008a); this distribution and designated critical habitat are shown in Figure 3.3-5. The species and its habitat are known to be present along Coyote Ridge within the Metcalf and Kirby critical habitat units, in the Santa Teresa Hills within the Santa Teresa Hills critical habitat unit, on the northern half of Tulare Hill within the Tulare Hill critical habitat unit, on the northernmost of the two subunits of the Kalana Hills critical habitat unit on the west side of Coyote Valley, west of Calero Reservoir in the Calero Reservoir critical habitat unit, adjacent to Hale Avenue in the Hale critical habitat unit, in the western foothills of the Santa Clara Valley in the San Martin critical habitat unit, and in small patches of grassland just west of Coyote Reservoir in the Bear Ranch critical habitat unit (USFWS 2008a, ICF Jones & Stokes 2010). All of these areas contain serpentine grasslands that provide sufficient populations of host plant species. Given the intensive nature of research that has been conducted on this species, it is unlikely to occur in areas that are not currently known.

Relative to Proposed Project work sites, the Bay checkerspot butterfly is known or expected to occur in the following locations, based on designated critical habitat:

- along the Coyote Canal, from the vicinity of the U.S. Highway 101 crossing of Coyote Creek (north of Morgan Hill) northwest to the point at which the canal crosses westward under U.S. Highway 101; in two limited areas just south of Bailey Avenue; and in a relatively limited area between Field Sports County Park and U.S. Highway 101 north of Bailey Avenue—in these areas, Bay checkerspot is likely to occur very infrequently (e.g., only in or following years of high population size), if at all, given that these sites are located so low at the toe of the slope of Coyote Ridge;
- along the Coyote Canal Extension just northwest of Field Sports County Park—again, Bay checkerspot is likely to occur very infrequently (e.g., only in or following years of high population size), if at all, in this location because it is located so low at the toe of the slope of Coyote Ridge;
- along upper Silver Creek, near Yerba Buena Road, Proposed Project activities are projected in a few very limited areas that are designated as Bay checkerspot critical habitat but that likely do not support the species, given the riparian nature of the habitat present;

- along Coyote Alamitos Canal along the northwestern edge of Tulare Hill, some potential exists for Bay checkerspot to occur along the canal, especially in years of high population size;
- along Coyote Alamitos Canal along the northern edge of the Santa Teresa Hills, a very low probability of occurrence of the butterfly exists in this area because of unsuitability of habitat; critical habitat actually ends just upslope from the canal in most of this area; and
- along Almaden Calero Canal in the San Vicente area west of Calero Reservoir, some potential exists for Bay checkerspot to occur along the canal.

The following designated Bay checkerspot butterfly critical habitat units occur in the Project Area: Metcalf (Unit 5), Tulare Hill (Unit 6), Santa Teresa Hills (Unit 7), Calero Reservoir (Unit 8), Kalana Hills (Unit 9), Hale (Unit 10), Bear Ranch (Unit 11), San Martin (Unit 12), and Kirby (Unit 13)

Green Sturgeon (*Acipenser medirostris*). Federal Listing Status: Threatened; State Listing Status: Species of Special Concern. The NMFS listed the southern Distinct Population Segment (DPS) of the green sturgeon as threatened on April 7, 2006 (NMFS 2006). Critical habitat for the southern DPS was designated on October 9, 2009 (NMFS 2009). All tidally influenced areas of San Francisco Bay in the Project Area, up to the elevation of mean higher high water have been designated as critical habitat. The range of the green sturgeon extends from Ensenada, Mexico, to the Bering Sea; the species occurs in coastal waters from the San Francisco Bay to Canada.

Green sturgeon occur widely in accessible estuarine habitat and, in summer and fall, the species is found in estuaries not associated with known spawning activity and where no records exist of their occurrence farther up the river system. Spawning within the southern DPS occurs predominantly in the upper Sacramento River. (Adams et al. 2007)

Green sturgeon juveniles are found throughout the Sacramento/San Joaquin River delta and portions of San Francisco Bay. Although little is known about the distribution and abundance of green sturgeon in South San Francisco Bay, the species appears to be relatively rare in the South Bay. The CDFG conducts monthly monitoring of fish assemblages at numerous sites in the San Francisco, San Pablo, and Suisun bays, using otter trawls and midwater trawls, of which 13 sites are in South San Francisco Bay. Between 1980 and 2006, 69 green sturgeon were captured in the San Francisco Estuary; however, only four green sturgeon were collected in the South Bay during this time, two at a main channel site near the Bay Bridge and two at a shoal site north of the San Mateo Bridge (R. Baxter, CDFG, unpublished data). According to NMFS (2009), a sport fishing group reported catches of two green sturgeon in Central San Francisco Bay, three in South-Central San Francisco Bay, and four in South San Francisco Bay in 2006.

No evidence exists that the southern green sturgeon has ever spawned in any creeks in the Project Area or anywhere else in the South Bay. Based on this species' preferences for streams having strong flow over large cobbles in deep pools, it is unlikely that South Bay tributaries historically provided suitable spawning habitat, and such habitat is certainly absent now. If the species occurs in lower portions of sloughs in the Project Area, it is not expected to swim far upstream because no spawning habitat exists to which such fish would be migrating. Thus, the species is likely to occur in the Project Area only irregularly and in low numbers because of the very limited abundance of the species in the vicinity. Furthermore, few encounters are expected because of the limited extent of SMP Update activities proposed in tidal habitats.

Longfin Smelt (*Spirinchus thaleichthys*). Federal Listing Status: Proposed Endangered; State Listing Status: Threatened. This southernmost population of longfin smelt is found as far north as Prince William Sound, Alaska, and occurs in the San Francisco Bay. The longfin smelt was declared a

threatened species under the CESA in March 2009, and has been petitioned for listing as endangered under the FESA (USFWS 2008b). Suisun and San Pablo bays, where salinity generally ranges from 2 to 20 parts per thousand, support the most abundant populations of non-breeding longfin smelt in the Bay area. Spawning occurs in fresh water in the upper end of the San Francisco Bay and in the Sacramento-San Joaquin Delta (Wernette 2000). Longfin smelt occur in the South Bay year-round, as pre-spawning adults and yearling juveniles (Wernette 2000), and the species has been collected in the Alviso area and in Alviso Slough (EDAW 2007). In 2010, this species also was collected within the Island Ponds (Hobbs 2011), located between Coyote Slough and Mud Slough, breached in June 2006 for tidal marsh restoration. However, this species is not known to spawn in the Project Area, and the species is likely to occur in the Project Area infrequently and in low numbers because of the very limited abundance of the species in the vicinity. Furthermore, few encounters are expected because of the limited extent of Project activities proposed in tidal habitats.

Central California Coast Steelhead (*Oncorhynchus mykiss*). Federal Listing Status: Threatened; State Listing Status: None. The steelhead is an anadromous form of rainbow trout that migrates upstream from the ocean to spawn in late fall or early winter, when flows are sufficient to allow it to reach suitable habitat in far upstream areas. In the Project Area, adults typically migrate to spawning areas from late December through early April, and both adults and smolts migrate downstream from February through May. Steelhead typically spawn in gravel substrates located in clear, cool, perennial sections of relatively undisturbed streams, with dense canopy cover that provides shade, woody debris, and organic matter. Steelhead usually cannot survive long in pools or streams with water temperatures above 70 °F; however, they can use warmer habitats if adequate food is available. Steelhead populations have declined because of degradation of spawning and rearing habitat, introduction of barriers to upstream migration, over-harvesting by recreational fisheries, and reduction in winter flows because of damming and spring flows caused by water diversion.

The NMFS has categorized steelhead into DPS. The Central California Coast DPS consists of all runs from the Russian River in Sonoma County south to Aptos Creek in Santa Cruz County, including all steelhead spawning in streams that flow into the San Francisco Bay. In 1998, the NMFS published a final rule to list the Central California Coast DPS as threatened under the FESA (NMFS 1998). Critical habitat for this DPS was designated on September 2, 2005 (NMFS 2005). In the Project Area, designated critical habitat includes accessible reaches of Upper Penitencia, Coyote, Stevens, San Francisquito, and Los Trancos creeks, as well as the Arroyo Aguague and the Guadalupe River upstream nearly to its confluence with Los Gatos Creek (Figure 3.3-6).

Steelhead historically have occurred more abundantly in streams throughout the Project Area, but it now is relatively rare because of urbanization, the presence of barriers to movement, and loss of spawning and rearing habitat (Leidy et al. 2005). In the Project Area, Central California Coast steelhead is known to occur in, and suitable spawning habitat is present in, Coyote Creek, Upper Penitencia Creek, Los Gatos Creek, Alamitos Creek, Calero Creek, Guadalupe Creek, Stevens Creek, San Francisquito Creek, and the Guadalupe River (Figure 3.3-6) (Leidy et al. 2005, NMFS 2005). This species also may be present in Calero Creek, though it does not appear to be present in Ross Creek (Leidy et al. 2005). Steelhead is absent from Lower Penitencia Creek, Calabazas Creek, the portion of Saratoga Creek that intersects the Project Area, San Tomas Aquino Creek, Thompson Creek, Canoas Creek, and Berryessa Creek, and it is unlikely to be present in Lower Silver Creek (Leidy et al. 2005). Steelhead potentially can spawn in virtually any reach of streams in the Project Area that offer suitable spawning habitat and lack downstream barriers to dispersal, and it likely occurs in all accessible portions of streams in the Project Area during migration between the ocean and upstream spawning and rearing areas. Tidal channels in brackish marshes, such as sloughs in the Alviso area, may provide habitat for juveniles during the process of smoltification (i.e., physiological adaptation to the saltwater environment). Table I-1 presents the upper limits of Central California Coast steelhead distribution within creeks in the Project Area.

Table I-1. Central California Coast Steelhead Distribution in the Project Area

Creek/River	Upper Limit of Steelhead Distribution
Alamitos Creek	Almaden Dam
Arroyo Calero	Calero Dam
Arroyo Aguague	Falls upstream from confluence with Upper Penitencia Creek
Coyote Creek	Leroy Anderson Dam/Anderson Lake
Guadalupe River	Guadalupe Dam
Los Gatos Creek	Camden Avenue Drop Structure
Los Trancos Creek	Approximately 0.4 mile north of headwaters
San Francisquito Creek	Searsville Dam
Stevens Creek	Stevens Creek Dam
Upper Penitencia Creek	Cherry Flat Dam (Cherry Flat Reservoir)

Source: CalFish 2010

South-Central California Coast Steelhead (*Oncorhynchus mykiss*). Federal Listing Status: Threatened; State Listing Status: None. The South-Central California Coast steelhead includes all steelhead spawning from the Pajaro River south to (but not including) the Santa Maria River. In 1997, NMFS published a final rule to list the South-Central California Coast DPS of steelhead as threatened under the FESA. Critical habitat for this DPS was designated on September 2, 2005 (NMFS 2005). In the Project Area, designated critical habitat includes accessible reaches of Pacheco, Cedar, Llagas, Uvas/Carnadero, Tar, Bodfish, Little Arthur, and Pescadero creeks, as well as the Pajaro River.

In the Project Area, South-Central California Coast steelhead is known to occur in the Pajaro River watershed, including the streams listed in Table I-2 (Figure 3.3-6). The majority of South-Central California Coast steelhead in the Project Area apparently breeds in Uvas Creek. Steelhead likely occurs in all accessible portions of these streams during migration between the ocean and upstream spawning and rearing areas. Steelhead is able to access Llagas Creek, although it is likely unable to reach suitable spawning habitat because of low flows in the lower reaches. Table I-2 presents the upper limits of South-Central California Coast steelhead distribution within creeks in the Project Area.

Table I-2. South-Central California Coast Steelhead Distribution in the Project Area

Creek/River	Upper Limit of Steelhead Distribution
Bodfish Creek	Bodfish Creek Falls
Cedar Creek	Approx. 3 miles north of Cedar Creek Boulder Falls #2
Little Arthur Creek	Cement Dam (near Redwood Retreat Road crossing)
Llagas Creek	Chesbro Reservoir Dam
Pacheco Creek	North Fork Dam
Pajaro River	Steelhead occur in all portions of the creek within Santa Clara County
Pescadero Creek	Creek source
South Fork Pacheco Creek	South Fork Pacheco Creek Boulder Falls
Tar Creek	Southern end of Castro Valley approximately 1.8 river miles from source
Uvas/Carnadero Creek	Uvas Dam

Source: CalFish 2010

California Tiger Salamander (*Ambystoma californiense*). Federal Listing Status: Threatened (Central Population); State Listing Status: Endangered. The California tiger salamander's preferred breeding habitat consists of temporary (minimum of 3-4 months), ponded environments (e.g., vernal pool, ephemeral pool, or human-made ponds) surrounded by uplands that support small mammal burrows. California tiger salamander also will utilize permanent ponds provided aquatic, vertebrate predators are not present. Such ponds provide breeding and larval habitat, while burrows of small mammals such as California ground squirrels and valley pocket gophers in upland habitats provide refugia for juveniles and adults during the dry season.

The range of the California tiger salamander is restricted to the Central Valley and the South Coast Range of California from Butte County south to Santa Barbara County. Tiger salamander has disappeared from a significant portion of its range because of habitat loss from agriculture and urbanization and the introduction of non-native aquatic predators. The California tiger salamander was listed as threatened in August 2004 (USFWS 2004a), and critical habitat was designated in August 2005 (USFWS 2005b). Designated critical habitat in the Project Area includes Unit 3 east of Calaveras Reservoir; Unit 5 northeast of Cherry Flat Reservoir; Unit 6 along Mt. Hamilton Road; Unit 7 near the northwestern end of Anderson Reservoir; Unit 8 located around Calero Reservoir; Unit 9 southwest of Coyote Reservoir; Units 10a and 10b west/southwest of San Martin; Unit 11 at the southern end of Henry Coe State Park; and Unit 12 along Highway 152 east of Gilroy (Figure 3.3-10). The California tiger salamander is considered a covered species by the draft Habitat Plan (ICF Jones & Stokes 2010).

In 1999, H. T. Harvey & Associates (1999c) prepared a report and maps documenting the known occurrences of the California tiger salamander in Santa Clara County and predicting the expected distribution of the species based on known occurrences, habitat suitability, and available information on survey effort within areas where the species had not been recorded. In preparing the analysis for the DSEIR, H. T. Harvey & Associates updated the mapping of the species' expected distribution, based on additional occurrences, additional information regarding this species' movements (e.g., indicating the long-distance dispersal capabilities of the species), and changes in land use (such as new development) since 1999. The expected distribution of the species in Santa Clara County, based on this analysis, is shown in Figure 3.3-10.

Historically, the California tiger salamander likely occurred in a number of locations in the Project Area. However, relatively few populations are still extant because filling or draining of ponds and development of upland habitat have restricted suitable habitat conditions to a few undeveloped areas. The species has been largely extirpated from the valley floor. As shown in Figure 3.3-10, California tiger salamander is absent from the majority of the urbanized valley floor in the northern part of the Project Area. The lone exception is a single population that is extant near Communications Hill in south San Jose. California tiger salamander also is considered extirpated from the majority of the valley floor south of the urban San Jose area, where intensive agricultural and urban development have eliminated breeding populations. Breeding sites are known at the edges of Coyote Valley (e.g., south of Bailey Avenue and west of Santa Teresa Boulevard), where ponds are located close to relatively undisturbed grasslands at the bases of the foothills. To account for the potential occurrence of California tiger salamander at similar locations elsewhere, the mapping that produced Figure 3.3-10 was done conservatively, including areas that maintained some relatively undisturbed grassland or pasture at the edges of the valley floor in the areas where the species was considered extant, even if no records of tiger salamander existed from those areas. However, tiger salamander was considered extirpated from intensively cultivated areas and areas of extensive development, especially areas lacking ponds or seasonal wetlands.

California tiger salamander is not known or expected to breed in streams such as those in the Project Area. If the species attempted to breed in such streams or even in SCVWD's canals, flow would wash the eggs downstream, and successful breeding is not expected to occur in this lotic environment. As a result, California tiger salamander is expected to occur in Proposed Project work sites solely during upland dispersal or, possibly, within upland refugia such as small mammal burrows. Specific locations where Proposed Project activities would occur within the area where the California tiger salamander is considered extant are depicted in Figure 3.3-10 and discussed in detail in the effects analysis below.

Currently, extant populations in the Project Area are now limited primarily to areas with seasonal pools and stock ponds around the periphery of the Project Area, particularly in the less heavily developed areas and areas that have not been heavily cultivated.

Critical habitat for the California tiger salamander was designated by the USFWS in 2005 (USFWS 2005b). The following designated California tiger salamander critical habitat units occur in or near the Project Area (Figure 3.3-10): Unit 3 east of Calaveras Reservoir, Unit 5 northeast of Cherry Flat Reservoir, Unit 6 along Mt. Hamilton Road, Unit 7 near the northwestern end of Anderson Reservoir, Unit 8 located around Calero Reservoir; Unit 9 southwest of Coyote Reservoir; Units 10a and 10b west/southwest of San Martin; Unit 11 at the southern end of Henry Coe State Park, and Unit 12 along Highway 152 east of Gilroy.

California Red-legged Frog (*Rana draytonii*). Federal Listing Status: Threatened; State Listing Status: Species of Special Concern. The California red-legged frog inhabits perennial freshwater pools, streams, and ponds throughout the Central California Coast Range and isolated portions of the western slope of the Sierra Nevada (Fellers 2005). Its preferred breeding habitat consists of deep perennial pools with emergent vegetation for attaching egg clusters (Fellers 2005), as well as shallow benches to act as nurseries for juveniles (Jennings and Hayes 1994). Non-breeding frogs may be found adjacent to streams and ponds in grasslands and woodlands, and may travel up to 2 miles from their breeding locations across a variety of upland habitats (Bulger and Scott 2003, Fellers and Kleeman 2007).

The historic distribution of the California red-legged frog extended from the city of Redding in the Central Valley and Point Reyes National Seashore along the coast, south to Baja California, Mexico. The species' current distribution includes isolated locations in the Sierra Nevada and the San Francisco Bay area, and along the central coast (USFWS 2002). The California red-legged frog was listed as threatened in June 1996 (USFWS 1996), based largely on a significant range reduction and continued threats to surviving populations (Miller 1994). Critical habitat was most recently designated in March 2010 (USFWS 2010b). Designated critical habitat in the Project Area includes portions of Units STC-1 and STC-2. These critical habitat units occur primarily east of (and outside) the Project Area, but portions are located in the Project Area near the northwestern end of Anderson Reservoir, along Highway 152 east of Gilroy, and elsewhere along the foothills of the Diablo Range.

In 1997, H. T. Harvey & Associates (1997) prepared a report and maps documenting the known occurrences of the California red-legged frog in Santa Clara County and predicting the expected distribution of the species based on known occurrences, habitat suitability, and available information on survey effort in areas where the species had not been recorded. In preparing the analysis for this DSEIR, H. T. Harvey & Associates updated the mapping of the species' expected distribution based on additional occurrences and changes in land use (such as new development) since 1999. The expected distribution of the species within Santa Clara County, based on this analysis, is shown in Figure 3.3-13.

The California red-legged frog presumably used to occur in pools and streams throughout the Project Area, but it was extirpated from the majority of the Project Area because of development, alteration of hydrology of its aquatic habitats, and introduction of non-native predators such as non-native fish and bullfrogs (Figure 3.3-13) (H. T. Harvey & Associates 1997). California red-legged frog is entirely absent from the urbanized valley floor in the northern part of the Project Area. California red-legged frog also is considered extirpated from the majority of the valley floor south of the urban San Jose area, where intensive agricultural and urban development have eliminated breeding populations. Since 2004, SCVWD biologists have conducted pre-activity surveys for California red-legged frog along hundreds of miles of stream for SMP projects and capital projects in accordance with SCVWD's BMPs, and have never found a California red-legged frog within the area where the species is considered extirpated (Figure 3.3-13). Table 3.3-3 lists the locations of those surveys. Those survey results, coupled with the negative results of surveys by H. T. Harvey & Associates biologists on portions of the valley floor (including Coyote Valley) and the lack of any recent CNDDB records from those areas, support the mapping in Figure 3.3-13.

A few breeding sites are known from the edges of the foothills, such as near Kirby Canyon Landfill (east of U.S. Highway 101). To account for the potential occurrence of the species in such areas, the mapping that produced Figure 3.3-13 was done conservatively, and red-legged frog was considered potentially extant in any areas that maintained some relatively undisturbed natural habitat at the edges of the valley floor, even if no records of the species existed from those areas.

Any extant breeding population of red-legged frog likely is limited to the periphery of the Project Area. California red-legged frog also has been recorded in the upper reaches of several streams that flow into the Project Area, such as Saratoga, Calabazas, Guadalupe, and Upper Penitencia creeks. California red-legged frog from populations in streams located upstream from the Project Area may potentially disperse or be washed short distances down some of these streams, although it is not expected to occur on the valley floor.

California red-legged frog potentially could breed in streams where SMP Update activities are projected. However, this species is known from very few locations below the reservoirs along the major SCVWD-maintained streams, and the abundance of non-native fish predators along these streams reaches likely limits the viability of red-legged frog breeding populations along them. Although California red-legged frog potentially could occur along a number of stream reaches where SMP Update activities are projected (as discussed in greater detail in the effects analysis below), the probability of breeding populations being located within areas of projected activities and the number of individuals that may be present in Proposed Project work sites are low.

In Proposed Project work sites where California red-legged frog does occur, it is expected to make the greatest use of the aquatic channels and the riparian habitat immediately adjacent to the channel. It may forage or take refuge anywhere in the riparian habitats along these channels, but in areas with managed levees, use of drier, more open areas is expected to occur only during dispersal.

Critical habitat for the California red-legged frog was most recently designated by the USFWS in 2010 (USFWS 2010b). The following designated California red-legged frog critical habitat units occur in and near the Project Area (Figure 3.3-13): STC-1 and STC-2. These critical habitat units occur primarily east of (and outside) the Project Area, but portions are located within its boundaries near the northwestern end of Anderson Reservoir, along Highway 152 east of Gilroy, and elsewhere along the foothills of the Diablo Range.

San Francisco Garter Snake (*Thamnophis sirtalis tetrataenia*). Federal Listing Status: Endangered; State Listing Status: Endangered. The San Francisco garter snake was one of the first reptiles to be listed under the FESA by the USFWS in 1967. The San Francisco garter snake also was

listed under the CESA in 1971, and it is a fully protected species under the California Fish and Game Code. San Francisco garter snake remains threatened by continued habitat loss and degradation, as well as by illegal collecting by reptile fanciers. The San Francisco garter snake is a medium-sized (18–48 inches total length) snake with a wide dorsal stripe of greenish-yellow edged with black, bordered on each side by a broad red stripe followed by a black one, a belly that is a bright greenish-blue (often turquoise) and the top of the head is red. San Francisco garter snake has been observed in a number of aquatic and terrestrial habitats throughout its historic range, such as ponds, pools in or next to streams, streams, lakes, and reservoirs. The presence of adjacent upland areas with abundant small mammal burrows also is important as hibernation sites for snakes during the winter. The species prefers a dense cover of vegetation, such as willows, bulrushes, cattails, and tules. Adults mate during the spring and fall, and young are usually born alive during late July to early August. San Francisco garter snake depends on frogs, particularly the threatened California red-legged frog, for food.

Garter snakes in the northwestern part of the Project Area (i.e., in the Palo Alto/Stanford area) fall within the intergrade zone between the San Francisco garter snake and the red-sided garter snake (*Thamnophis sirtalis infernalis*). This intergrade zone is located on the eastern flank of the Santa Cruz Mountains, extending approximately 12 miles from the vicinity of Boronda Lake in Palo Alto (Foothills Park) to Upper Crystal Springs Reservoir (Barry 1994, Fox 1951), with populations to the south of this zone (i.e., the majority of the Project Area) representing the red-sided garter snake and populations to the north representing the San Francisco garter snake. The intergrade populations do not belong exclusively to either subspecies; thus, no true San Francisco garter snake occurs in the Project Area.

Bank Swallow (*Riparia riparia*). Federal Listing Status: None; State Listing Status: Threatened (Nesting). In the western hemisphere, the bank swallow is a neotropical migrant with a wide distribution, breeding locally in coastal and interior California as far south as Monterey County (Garrison et al. 1987, Roberson and Tenney 1993). Bank swallows are colonial nesters, excavating nesting burrows in vertical banks of streams, rivers, and ocean coasts. Nest sites in central California typically are composed of soft soils, with banks averaging at least 10 feet high and 0.25 mile long (Garrison et al. 1987). The historical range of the bank swallow in California has been dramatically reduced by streambed alterations, which have resulted in a widespread loss of nesting habitat. The nesting season for bank swallow begins in April and continues through July, when the species departs for its wintering grounds in Mexico and Central America.

The only record of bank swallows breeding in Santa Clara County is from the Pajaro River, and this colony has not been active in decades (Bousman 2007i). No suitable nesting habitat is present in the Project Area, and the species is not expected to breed here. Bank swallows occur in the Project Area only as rare transients.

California Condor (*Gymnogyps californianus*). Federal Listing Status: Endangered; State Listing Status: Endangered. The California condor was listed as endangered by the USFWS in 1967 (USFWS 1967) and by California in 1971. Critical habitat was designated for this species in 1976 (USFWS 1976); but no portion of the Project Area is within designated critical habitat. Historically, the condor ranged from Baja California to British Columbia, and likely foraged throughout the Project Area. However, the condor was extirpated from its entire range, and in 1987, the last remaining wild birds were captured and kept in zoos as part of a comprehensive captive breeding program. Intensive recovery efforts have produced a managed population, currently numbering approximately 150 free-flying birds, which range along the central and southern Coast Ranges from Monterey Bay in the north to Los Angeles County in the south; and across the Transverse Ranges and up the western slope of the southern Sierra Nevada. (Snyder and Schmitt 2002)

California condors seek out caves in steep, isolated cliffs or cavities in mature redwood trees for nesting, and forage over grasslands, open woodlands, and along coastal beaches. Consistent air movements that support the extended soaring flight utilized by the condor are a critical component of suitable habitat. Condors nest between February and November, laying one egg every other year. Medium- to large-bodied carcasses appear to be the preferred food source for condors, but smaller carcasses are readily consumed as well. (Snyder and Schmitt 2002)

The persistence of re-established condor populations is threatened primarily by lead contamination from spent ammunition, although habitat loss and collision with utility lines and towers also are important threats. (Meretsky et al. 2000, Cade 2007)

No breeding habitat for this species is present in the Project Area. California condors have been reintroduced into the wild at Pinnacles National Monument in San Benito County and on the Big Sur coast in Monterey County. Individuals from these reintroduction efforts occasionally wander into Santa Clara County; five such birds were observed at the summit of Mt. Hamilton, east of San Jose and well above the 1,000-foot elevation contour that delineates the upper limits of the Project Area, in mid-June 2011. However, no records are known in or near the Project Area, and at most, condors are expected to occur as infrequent visitors that overfly portions of the Project Area. Nevertheless, reintroduced birds potentially could expand their movements and eventually occur more regularly in or near the Project Area, most likely in the southern part of the area (but only as non-breeders).

Bald Eagle (*Haliaeetus leucocephalus*). Federal Listing Status: None; State Listing Status: Endangered, Fully Protected. Bald eagle populations exhibited precipitous declines in the early part of the twentieth century, primarily as a result of pesticide poisoning that severely affected reproductive rates. DDT was the most debilitating of these chemicals, and ever since its use was banned in the United States in 1972, eagle populations have recovered rapidly. (Buehler 2000) The bald eagle was removed from the federal endangered species list in 2008 (USFWS 2008c) but remains listed as both endangered and fully protected by California (CDFG 2008b).

Currently, bald eagles are found throughout North America, along waterways and coasts (Buehler 2000). In California, bald eagle populations remain low, although their numbers are increasing steadily (Peeters and Peeters 2005). Bald eagles can be found nesting in a number of locations in the Sierra Nevada range and southern California, and they nest in a few scattered locations in central California as well (Buehler 2000, CDFG 2008b).

Ideal habitat for bald eagles is comprised of remote, forested landscape with old-growth or mature trees and easy access to an extensive and diverse prey base. Bald eagles forage in fresh and salt water where their prey species (fish) are abundant and diverse. They build nests in tall, sturdy trees at sites that are in relatively close proximity to aquatic foraging areas and isolated from human activities. The eagle breeding season extends from January through August. (Buehler 2000)

Bald eagles are only known to nest in Santa Clara County in four locations—in a gray pine at Coyote Reservoir, at the eastern edge of the Project Area where a pair nested in 2010; in a gray pine at Anderson Reservoir, also at the eastern edge of the Project Area, where a pair nested successfully in 2010 and may have nested in prior years; on an electrical transmission tower near Calaveras Reservoir, just outside the Project Area; and at San Felipe Lake along Highway 152, where a pair was sited nesting in 2011 (Bousman 2007e). Small numbers also occur as non-breeding visitors, typically at reservoirs on either side of the Santa Clara Valley but occasionally in Coyote Valley as well.

Swainson's Hawk (*Buteo swainsoni*). Federal Listing Status: None; State Listing Status: Threatened. Swainson's hawk was listed as threatened by California in 1983 because of population declines likely precipitated by significant losses of riparian habitat and conversion of open foraging

habitats to developed lands (England et al. 1997, Woodbridge 1998). Swainson's hawks are distributed throughout western North America during the breeding season, but in California they are primarily limited to the Central Valley and the southeastern Great Basin region (Woodbridge 1998). Swainson's hawks in California are strongly associated with riparian habitats, although they also are found in oak woodlands and other open habitats (Smallwood 1995, England et al. 1997, Woodbridge 1998). Prime breeding habitat for Swainson's hawk encompasses riparian draws or clumps of trees surrounded by open grassland or oak savannah for foraging (England et al. 1997, Woodbridge 1998). They build sturdy stick nests in low willows, box elders, oaks, or other trees, breeding from early March though July (England et al. 1997). Swainson's hawks are neotropical migratory birds, flying south after the breeding season to spend their winter months on the Pampas of Argentina (England et al. 1997, Canavelli et al. 2003). Stresses on winter populations, including pesticide poisoning, on the winter grounds have contributed to declines in North American breeding populations.

Swainson's hawks apparently nested in small numbers in Santa Clara County historically, and an 1894 nest record exists from the Berryessa area (in eastern San Jose) (Bousman 2007g). Currently, this species is known to occur in the Project Area only as a very infrequent transient during migration. Although young, not long out of the nest have been recorded on several occasions in the Santa Clara Valley in recent years (Santa Clara County Bird Data, unpublished), more concrete evidence of nesting has not been documented, and this species is not currently known to breed in the Project Area.

California Clapper Rail (*Rallus longirostris obsoletus*). Federal Listing Status: Endangered; State Listing Status: Endangered and Fully Protected. The California clapper rail is a secretive marsh bird that is currently endemic to marshes of the San Francisco Bay. It formerly bred at several other locations, including Humboldt Bay (Humboldt County), Elkhorn Slough (Monterey County), and Morro Bay (San Luis Obispo County), but is now extirpated from all sites outside of the San Francisco Bay (Harding-Smith 1993). California clapper rails nest in salt and brackish marshes along the edge of the Bay, and are most abundant in extensive salt marshes and brackish marshes, dominated by Pacific cordgrass, pickleweed, and marsh gumplant, (*Grindelia stricta*) and that contain complex networks of tidal channels (Harvey 1980). Shrubby areas adjacent to or within these marshes also are important for predator avoidance at high tides.

Since the mid-1800s, about 90 percent of the San Francisco Bay's marshlands have been eliminated through filling, diking, or conversion to salt evaporation ponds (Goals Project 1999). As a result, the California clapper rail lost most of its former habitat, and its population declined severely. The subspecies was listed as endangered by the USFWS in 1970 (USFWS 1970) and by California in 1971. The USFWS approved a joint recovery plan of the salt marsh harvest mouse and the California clapper rail in 1984 (USFWS 1984), and its updated *Tidal Marsh Species Recovery Plan* is currently under development. Critical habitat has not been proposed for the California clapper rail.

California clapper rails breed from February through August within the salt marsh habitat along the lowermost, tidal reaches of creeks that flow into the South Bay. The species does not occur in muted tidal or diked salt marshes. However, they have been documented in brackish marshes in the South Bay. Surveys conducted during the 1990 breeding season (H. T. Harvey & Associates 1990b) and winter season (H. T. Harvey & Associates 1990a) found a number of California clapper rails occupying salt/brackish transitional marshes and several brackish, alkali bulrush-dominated marshes. In addition, California clapper rails were found in nearly pure stands of alkali bulrush along Guadalupe Slough in 1990 and 1991 (H. T. Harvey & Associates 1990a; H. T. Harvey & Associates 1990b; H. T. Harvey & Associates 1991).

Surveys by H. T. Harvey & Associates and others since the early 1990s, as well as observation by birders (including H. T. Harvey staff), have documented clapper rails in a number of areas near the

Project Area, including lower San Francisquito Creek; the Palo Alto Baylands; Hook's Isle; the mouth of Charleston Slough; lower Permanent and Stevens creeks; Guadalupe Slough (primarily from its confluence with Moffett Channel downstream); Alviso Slough; a number of locations along Coyote Slough, extending upstream through South Coyote Slough; and in the Warm Springs marshes. Although site-specific surveys have not been conducted in all suitable habitats for clapper rails in the South Bay, this species is likely to occur in tidal salt marsh habitats in a number of additional areas as well (Figure 3.3-20).

Occasional non-breeding individuals also may wander upstream along tidal sloughs from their typical salt marsh habitats into tidal brackish/freshwater marsh habitats. Such individuals have been recorded in the Project Area along upper Alviso Slough near the Gold Street Bridge and in the non-tidal freshwater marsh/ponds between Calabazas and San Tomas Aquino Creeks north of SR 237 (H. T. Harvey & Associates, unpublished data), but only during the non-breeding season.

California Black Rail (*Laterallus jamaicensis coturniculus*). Federal Listing Status: None; State Listing Status: Threatened, Fully Protected. The California black rail is a small rail that inhabits a variety of marsh types. California black rail is most abundant in extensive tidal marshes with some freshwater input (Evens et al. 1991). They nest primarily in pickleweed-dominated marshes with patches or borders of bulrushes, often near the mouths of creeks. The black rail builds nests in tall grasses or marsh vegetation during spring, and lays about six eggs. Nests are usually constructed of pickleweed and are placed directly on the ground or slightly above ground in vegetation. The black rail feeds on terrestrial insects, aquatic invertebrates, and possibly seeds (Trulio and Evens 2000).

The California black rail reportedly bred in the Alviso area in the early 1900s (Wheelock 1916), but currently it is not known to breed in the South Bay. Black rails breed primarily in marshes in north San Francisco Bay (i.e., San Pablo Bay and Suisun Bay). Following breeding, some black rails disperse into the South Bay during the non-breeding season; however, their abundance is unknown. They are likely present in small numbers at scattered locations in the South Bay during the non-breeding season (e.g., unconfirmed reports exist from the Alviso Marina during high winter tides).

The absence (or scarcity) of breeding black rails in the South Bay is presumably a result of habitat loss. Tidal marsh habitat has been lost, but perhaps more important to winter survival is loss of high-tide refugia habitat. Upland transition habitat, both on natural levees within marshes and on landward edges of marshes, has been lost as a result of fill for development, and reductions in marsh size and resulting reductions in natural levees along higher-order channels. Predation by egrets, herons, gulls, and harriers has been observed in these marshes during winter high tides, as black rails are forced into the open by rising water. The importance of this predation on a population level, especially in light of impacts to high tide refugia, is unknown, but it may be a significant factor in the extirpation of breeding populations of the species from the South Bay.

Western Snowy Plover (*Charadrius alexandrinus nivosus*). Federal Listing Status: Threatened; State Listing Status: Species of Special Concern. The snowy plover is a small shorebird that occurs on almost every continent. On the Pacific coast, snowy plovers nest on sandy beaches and salt panne habitat from Washington to Baja Mexico. Because they nest during the summer, primarily on beaches in a temperate climate, snowy plovers are susceptible to nest disturbance and other negative interactions with humans. Much of their nesting habitat, particularly in southern California, has been lost to development and high human use. In addition, introduced predators, especially the non-native red fox, have had dramatic effects on snowy plover nesting success (Neuman et al. 2004). In response to severe population declines, the USFWS listed the Pacific coast population of the western snowy plover as threatened in 1993. Critical habitat was designated for this population in 1999 (USFWS 1999b), and a revised recovery plan was released in 2007 (USFWS 2007). None of the breeding sites within the San Francisco Bay are considered critical habitat.

In the South San Francisco Bay, snowy plovers nest on low, barren to sparsely vegetated saline managed pond levees and islands, at pond edges, and on salt panne areas of dry ponds (Page et al. 2000), and preferentially use light-colored substrates such as salt flats (Feeney and Maffei 1991, Marriott 2003). Nesting areas are located near water, where prey (usually brine flies and other insects) are abundant. In some areas, snowy plovers nest within dry saline managed ponds; in other areas where ponds typically hold water through the summer, nests are located primarily on levees.

In the South Bay, the highest numbers of nesting snowy plovers occur in portions of Alameda and San Mateo counties, outside the Project Area. Until recently, the area in Santa Clara County that consistently supported the highest numbers of nesting snowy plovers was Pond A8, located between Alviso and Guadalupe sloughs, just west of the town of Alviso (Ryan and Parkin 1998, Strong 2004). However, that pond has been flooded as part of Phase 1 of the South Bay Salt Ponds Restoration Project, and its managed depth will no longer allow for the exposure of salt panne and island habitat suitable for plover nesting. Similarly, Pond A6 (located between the mouths of Alviso and Guadalupe sloughs) previously supported low numbers of nesting snowy plovers, but it was recently breached as part of the South Bay Salt Ponds Restoration Project, and thus no longer provides suitable breeding habitat.

The areas that have supported nesting snowy plovers in recent years and still provide suitable conditions for nesting are portions of New Chicago Marsh, providing salt panne habitat, and an impoundment between pond A12 and New Chicago Marsh. During the 2009 breeding season, seven western snowy plover nests were located in the Alviso complex, including one snowy plover nest in Pond A8, one in the impoundment, and five nests in New Chicago Marsh (SFBBO 2009). Snowy plovers also nested in the late 1990s in Pond A3N, on the southwest side of the mouth of Guadalupe Slough (S. Rottenborn, pers. obs.). To provide nesting habitat for snowy plovers and other pond-associated waterbirds, given the modifications that have been made to former nesting areas in Ponds A6 and A8, the Refuge has been maintaining low water levels in Pond A12 (immediately north/northwest of the Alviso Marina) to provide salt flats and islands, and plovers are likely to nest in this pond. Figure 3.3-20 depicts locations in the vicinity of the Project Area where suitable nesting habitat for snowy plover may occur. In all of these potential breeding locations, nesting may occur on extensive salt flats or islands. The large flood protection levees with extensive vegetation on their banks, such as the ones lining sloughs within the Project Area, are not used by snowy plover for nesting.

Although snowy plovers in the South Bay do show seasonal variations in distribution and abundance, they are observed infrequently, away from nesting areas in Santa Clara County, primarily because nesting areas provide the most suitable foraging habitat for the species year-round. Snowy plovers are expected to forage a bit more widely than the nesting areas indicated in Figure 3.3-20, and it is possible that non-breeding individuals may occasionally forage in the San Jose-Santa Clara Water Pollution Control Plant sludge ponds, or possibly at the Coyote Creek Reach 1A waterbird pond, both of which would be very close to Proposed Project work sites. However, they are expected to do so infrequently and in low numbers, if at all.

No SMP Update activities are projected to occur in or very close to areas that support nesting snowy plovers. However, this species can select breeding areas opportunistically, and it is possible that changes in habitat from 2012–2022 could result in use of new areas by breeding plovers. For example, if management of ponds adjacent to Proposed Project work sites (such as Pond A4 between Moffett Channel and Guadalupe Slough, or Pond A18 adjacent to South Coyote Slough) changed so that these ponds became suitable for nesting, plovers may nest in them. Likewise, if proposed activities such as vegetation management or management of animal conflicts needed to occur in non-projected areas, such as segments of Alviso Slough along Pond A12, then SMP Update activities could occur adjacent to snowy plover nesting and foraging habitat.

Final critical habitat for the western snowy plover was designated on September 29, 2005 (USFWS 2005c). No designated critical habitat for this species is located in or adjacent to the Project Area. On March 22, 2011, the USFWS proposed a new critical habitat designation that would include additional critical habitat. Under this proposed rule, the closest area of proposed critical habitat to the Project Area would be located in the northeastern portions of Ponds A22 and A23, located in the Warm Springs area of Fremont, approximately 0.75 mile north of the Project Area.

California Least Tern (*Sterna antillarum brownii*). Federal Listing Status: Endangered; State Listing Status: Endangered, Fully Protected. California least tern nests in California during the breeding season, from April to September (Rigney and Granholm 1990, Baron and Takegawa 1994). Its nesting habitat consists of shallow depressions in sand or small gravel along large tracts of undisturbed beaches (Baron and Takegawa 1994, Marschalek 2008). The loss of available, high-quality nesting habitat for least terns resulted in a reduction in population size to only 600 known breeding pairs (Baron and Takegawa 1994). In response to severe population declines, the USFWS listed the California least tern as endangered in 1970 (USFWS 1970), and California listed the species as both endangered and fully protected in 1971. No critical habitat has been designated for this species.

Habitat requirements for the California least tern typically consist of quiet, extensive beaches or tidal flats close to an abundance of small fish (Baron and Takegawa 1994, Rigney and Granholm 1990). In San Francisco Bay, this species' largest colony is located on an old airport runway at the former Alameda Naval Air Station, although small numbers nest on islands and salt pannes in former saline managed ponds in a few areas.

California least terns do not breed in or adjacent to the Project Area. However, the South Bay is an important post-breeding staging area, and California least terns forage in late summer and early fall in saline-managed ponds within and adjacent to the Alviso area. Both adult and juvenile least terns roost on saline-managed pond levees (both outboard levees and interior levees between ponds) and boardwalks, and forage both in the saline-managed ponds and over the open waters of the Bay. In recent years, the post-breeding (late summer/fall) staging area for least terns in the South Bay has been in the complex of saline-managed ponds immediately north of Moffett Field (Ponds AB1, A2E, and AB2). This site is used predictably for roosting and foraging by both adult and juvenile least terns in July and August each year, with typical counts of 20 to 100 birds. Least terns also have been recorded at a number of ponds in the Project Area, including A5, A7, A9, A10, A11, and A14. (Hurt, pers. comm., 2004; Krause, pers. comm., 2005)

Least Bell's Vireo (*Vireo bellii pusillus*). Federal Listing Status: Endangered; State Listing Status: Endangered. The least Bell's vireo is a small neotropical migratory songbird that is sparsely distributed along waterways in southern California and northern Baja California, Mexico (Brown 1993). The least Bell's vireo was historically distributed throughout much of California, including the Central Valley (Franzreb et al. 1994, Kus 2002). However, extensive habitat destruction and declines in nest survival caused by heavy parasitism by the brown-headed cowbird (*Molothrus ater*) resulted in severe population declines, and the species' range decreased to a few small remnant populations in riparian drainages in the eight counties south of Santa Barbara, with the greatest abundance of the vireos occurring in San Diego County (Franzreb et al. 1994, Kus 2002). The least Bell's vireo was listed as endangered by California in 1980, and by the USFWS in 1986 (USFWS 1986). No critical habitat for this species occurs in Santa Clara County (USFWS 1994).

The least Bell's vireo is a riparian-obligate breeder (Kus 1998), nesting in dense thickets of willows and other low bushes along perennial or ephemeral streams (Franzreb et al. 1994, Kus 2002). Prime least Bell's vireo habitat can be described as a wide (greater than 825 feet) riparian corridor (Kus 2002) with dense shrub growth extending vertically from 2 to 10 feet (Brown 1993), few trees

greater than 3 inches in diameter at breast height in the canopy, and an open canopy (Sharp and Kus 2006). Upland vegetation adjacent to riparian habitats frequently is used for foraging, and sometimes nesting, by least Bell's vireo (USFWS 1998c). Least Bell's vireo arrives on its breeding grounds in mid-March, and its nesting season extends from early April through July (Brown 1993). The species exhibits high breeding site fidelity, returning to the same territory, and even nesting in the same shrub, over multiple years (Kus 2002).

The coastal range of this species (i.e., west of the Central Valley) once extended north through the Salinas River valley, but apparently ended in extreme southern Santa Clara County, where the only record before 1997 was a nest collected at Sargent along the Pajaro River (on the Santa Clara/San Benito County line near the current location of U.S. Highway 101) in 1932 (Unglish 1937).

By 1930, declines were widespread, mostly because of parasitism by brown-headed cowbirds. The least Bell's vireo was thought to be extirpated from northern California by 1970. Isolated and infrequent sightings of singing males in northern and central California have suggested that the species may eventually recolonize historic habitat in northern California. In 1972, and again in 1982, lone singing males were found in riparian habitat in Pinnacles State Park, in San Benito County (Roberson 2002). In 1983, three singing males were found on the Salinas River in southern Monterey County, and a female was observed building a nest.

In the past two decades, populations of least Bell's vireos have begun to rebound because of intensive recovery efforts (Kus 2002, USFWS 2006). However, the species is still not known to have recolonized former breeding areas in southern Monterey County, and only three records have been made from Santa Clara County since 1932. Beginning in 1997, SCVWD has conducted least Bell's vireo surveys almost annually along lower Llagas Creek, and occasionally along sections of Uvas Creek, during the breeding season (Padley 2010, H. T. Harvey & Associates 2010c). A pair was detected in April and May 1997, and two singing males were reported on May 17, 2001 (Rottenborn 2007d); both of these records were from lower Llagas Creek between Highway 152 and the confluence with the Pajaro River, just east of Gilroy. A single male was heard singing along Coyote Creek near the Coyote Creek Golf Course on June 20, 2006 (H. T. Harvey & Associates, unpublished). This individual was sought but not relocated subsequently, and it is not likely to have bred in the vicinity. No other recent records of the least Bell's vireo exist in Santa Clara County.

Least Bell's vireo numbers may increase in number and distribution as its core populations increase, but it is unlikely to ever be more than a rare and very locally occurring breeder along South County streams. In the Project Area, least Bell's vireo is expected to breed only along streams in the Pajaro Basin, and even then only sporadically and in low numbers. Portions of lower Llagas Creek (downstream from Highway 152), the Pajaro River (from Llagas Creek downstream), and lower Uvas/Carnadeo Creek (downstream from Hecker Pass Road) provide suitable habitat for the species, and SMP Update activities are projected in these areas. However, protocol-level surveys for the species were conducted along Uvas Creek between Hecker Pass Road and Santa Teresa Boulevard in 2006 (H. T. Harvey & Associates, unpublished data), and along portions of Uvas/Carnadero Creek, the Pajaro River, Tar Creek, and other waterways along U.S. Highway 101 south of Gilroy in 2007 (H. T. Harvey & Associates 2011), with negative results. Combined with the results of SCVWD's recent surveys along lower Llagas Creek, these negative survey results suggest that this species likely is absent from the county in most years. Potential habitat for the species also is present in the Project Area along lower Pacheco Creek, although no SMP Update activities are projected in that area.

Salt Marsh Harvest Mouse (*Reithrodontomys raviventris*). Federal Listing Status: Endangered; State Listing Status: Endangered, Fully Protected. The salt marsh harvest mouse is found only in saline wetlands of the San Francisco Bay and its tributaries. The southern subspecies *raviventris* is restricted to an area along both sides of San Francisco Bay, from San Mateo County and Alameda

County south to Santa Clara County. Although its primary habitat consists of pickleweed-dominated areas in the upper regions of tidal marshes, the salt marsh harvest mouse also is found in diked and muted tidal marshes dominated by pickleweed, and recently it has been found in dense vegetation within brackish marshes in the South Bay, specifically tri-corner bulrush marshes that are mature and have a thick, well-developed layer of thatch (H. T. Harvey & Associates 2006, 2010a). The salt marsh harvest mouse occurs with the closely related, ubiquitous, and abundant western harvest mouse (*Reithrodontomys megalotis*) at the upper edges of marshes and in marginal areas. Both animals occur in pickleweed, but the salt marsh harvest mouse replaces the western harvest mouse in denser areas of pickleweed.

The salt marsh harvest mouse has declined substantially in recent decades. This decline has been primarily caused by the diking and filling of marshes, subsidence, and changes in salinity brought about by increasing volumes of fresh water discharge into the Bay. In response to habitat loss and population declines, the salt marsh harvest mouse was listed as endangered by the USFWS in 1970 (USFWS 1970) and by California in 1971. Critical habitat has not been designated for this species.

In the Project Area, salt marsh harvest mouse is known from a variety of locations in the South Bay, especially from the tidal salt marshes of the Bay, levees, and from a series of diked salt marshes (H. T. Harvey & Associates 2010a). Potential salt marsh harvest mouse habitat in the Project Area, mapped based on the assessment by H. T. Harvey & Associates, is depicted in Figure 3.3-22.

San Joaquin Kit Fox (*Vulpes macrotis mutica*). Federal Listing Status: Endangered; State Listing Status: Threatened. The San Joaquin kit fox is the largest subspecies of the kit fox, the smallest canid species in North America. The San Joaquin kit fox was listed as endangered by the USFWS in 1967 and by California in 1971. Loss of habitat from urban, agricultural, and industrial development are the principal factors in the decline of the San Joaquin kit fox. Subpopulations of the San Joaquin kit fox appear to be increasingly isolated from one another because of development within its range (USFWS 1998a). Critical habitat has not been designated for this species.

The San Joaquin kit fox is primarily nocturnal and typically occurs in annual grassland or mixed shrub/grassland habitats throughout low, rolling hills and in the valleys. It requires underground dens for temperature regulation, shelter, reproduction, and predator avoidance. Kit foxes commonly modify and use dens constructed by other animals and human-made structures (USFWS 1998a). Dens are usually located on loose-textured soils on slopes less than 40 degrees, but San Joaquin kit fox den characteristics vary across the fox's geographic range, including the number of openings, shape, and slope of the ground on which they occur (USFWS 1998a). Kit foxes change dens frequently, often using numerous dens each year.

San Joaquin kit foxes were infrequently sighted in San Benito County and southern Santa Clara County in the early 1970s. Morrell (1975) reported four sightings before 1972, and seven sightings between 1972 and 1975 in this region. These reports included nine sightings in San Benito County near Hollister and two sightings in Santa Clara County between Pacheco Pass and San Felipe Lake.

Since 1975, two reports of kit foxes have been made in Santa Clara County. Two adults were reported near Coyote (Weslar 1987), and one adult was reported near Bell's Station in an outlying portion of Henry Coe State Park in 2002 (CNDDB 2011). The Coyote report was not documented adequately to confirm that this species, which can be easily confused with other foxes or especially with young coyotes, was actually present. As a result, no firm records of the kit fox exist from the Project Area. Subsequent extensive surveys throughout the area have failed to detect any kit foxes, and kit foxes are now generally acknowledged to be extremely rare in Santa Clara County and found only in areas proximal to access from Central Valley population centers (e.g., near Highway 152 in the southeastern corner of the county). The species' preferred habitat, extensive low-lying grasslands

with minimal topography, is not present in the Project Area. If San Joaquin kit foxes occur in the Project Area, they are expected to occur only in the southeastern portion along Pacheco Creek and the uppermost Pajaro River. Kit fox may occur here during dispersal between areas of known breeding activity outside the Project Area (i.e., the Central Valley to the east and San Benito County to the south).

California Species of Special Concern

Central Valley Fall-run Chinook Salmon (*Oncorhynchus tshawytscha*). Federal Listing Status: None; State Listing Status: Species of Special Concern. Like the steelhead, the Chinook salmon is an anadromous salmonid. Populations of Pacific salmon have been categorized into Evolutionarily Significant Units (ESUs) by the NMFS; an ESU represents a population of Pacific salmon that is reproductively isolated from other conspecific populations and is recognized as a distinct evolutionary component of the species (Waples 1991). The Central Valley Fall-run ESU represents a population of Chinook salmon that migrate from the ocean to spawning streams in late fall and begin spawning in beds of coarse river gravels between October and December. Populations of fall-run Chinook salmon have suffered the effects of over-fishing by commercial fisheries, degradation of spawning and rearing habitat, added barriers to upstream migration, and reductions in winter flows because of damming. Approximately 40–50 percent of its spawning and rearing habitats in Central Valley streams have been lost or degraded. Chinook salmon generally spawn in cool waters that provide incubation temperatures no warmer than 55°F. Compared to steelhead, Chinook salmon are more likely to spawn in coarse gravels located lower in the watershed.

Chinook salmon historically did not spawn in streams flowing into South San Francisco Bay. Since the mid-1980s, however, small numbers of fall-run Chinook salmon have been found in several such streams, including Coyote Creek, Los Gatos Creek, and the Guadalupe River in the Project Area (Leidy et al. 2003). However, genetic analysis, timing of spawning, and the detection of coded wire-tagged hatchery fish in the Project Area suggest that these fish are derived from Central Valley fall-run stock (Garcia-Rossi and Hedgecock 2002), possibly hatchery releases. Conditions for successful spawning in the Project Area are marginal because these fish spawn during fall, when streamflow is at its lowest. Because these fish are not native to the South Bay and are apparently derived, at least in part, from hatchery stock, the NMFS does not consider the Chinook occurring in the South Bay to be a special-status species.

Monterey Roach (*Lavia symmetricus*). Federal Listing Status: None; State Listing Status: Species of Special Concern. The Monterey roach is a small minnow found primarily in small and intermittent tributaries in the San Lorenzo River, Pajaro River, and Salinas River watersheds. The Monterey roach forages primarily on algae, but juveniles often eat small invertebrates as an important part of their diet. Roaches can withstand extreme conditions found in late summer pools, such as high temperatures up to 95 °F and low oxygen levels down to 1 ppm. The Monterey roach is known to occur in Llagas and Uvas Creeks, and it likely is present in other Project Area creeks within the Pajaro River Basin.

Foothill Yellow-legged Frog (*Rana boylii*). Federal Listing Status: None; State Listing Status: Species of Special Concern. The foothill yellow-legged frog is a stream-breeding frog, historically found in most Pacific drainages from the Coast Ranges to the western Sierra Nevada and San Gabriel mountain foothills (Jennings and Hayes 1994, CaliforniaHerps.com 2010). Currently, the foothill yellow-legged frog may occupy only 55 percent of its historical range (CaliforniaHerps.com 2010). The main reason for the reduction in the species' range apparently is the alteration of stream hydrology because of the presence of dams (Jennings and Hayes 1994, Wheeler et al. 2006).

Ideal habitat for the foothill yellow-legged frog consists of streams with riffles and cobble-sized rocks, with slow water flow (Jennings and Hayes 1994). The breeding ecology of the foothill yellow-

legged frog requires consistently slow-moving flows, as well as the presence of upland areas surrounding the breeding locations for use as non-breeding habitat.

In 1999, H. T. Harvey & Associates (1999b) prepared a report and maps that documented the known occurrences of the foothill yellow-legged frog in Santa Clara County and predicted the expected distribution of the species, based on known occurrences, habitat suitability, and available information on survey effort within areas where the species had not been recorded. In preparing the analysis for this DSEIR, H. T. Harvey & Associates updated the mapping of the species' expected distribution, based on additional occurrences and changes in land use (such as new development) since 1999. The expected distribution of the species within Santa Clara County, based on this analysis, is shown in Figure 3.3-18. No recent records of foothill yellow-legged frog exists from the Santa Clara Valley floor, and although it still occurs in foothill streams in the Project Area, it is now presumed extirpated from the majority of the Project Area (Figure 3.3-18) (H. T. Harvey & Associates 1999b). At the edges of the Project Area, foothill yellow-legged frog is known to occur in Guadalupe Creek downstream from Guadalupe Reservoir, in Llagas Creek south of Calero Reservoir, and along Rincon Creek (CNDDB 2011). The species also occurs (or formerly occurred) in Upper Penitencia Creek in Alum Rock Park in the Project Area and at other South Bay locations outside the Project Area (H. T. Harvey & Associates 1999b).

Western Pond Turtle (*Actinemys marmorata*). Federal Listing Status: None; State Listing Status: Species of Special Concern. The western pond turtle occurs in ponds, streams, and other wetland habitats in the Pacific slope drainages of California and northern Baja California, Mexico (Bury and Germano 2008). The central California population historically was present in most drainages on the Pacific slope (Jennings and Hayes 1994), but streambed alterations and other sources of habitat destruction, exacerbated by frequent drought events, have caused substantial population declines throughout most of the species' range (Stebbins 2003). Ponds or slack-water pools with suitable basking sites (such as logs) are an important habitat component for this species, and western pond turtles do not occur commonly along high-gradient streams. Females lay eggs in upland habitats, in clay or silty soils in unshaded (often south-facing) areas up to 0.25 mile from aquatic habitat (Jennings and Hayes 1994). Juveniles feed and grow in shallow aquatic habitats (often creeks) with emergent vegetation and ample invertebrate prey. Nesting habitat typically is found within 600 feet of aquatic habitat (Jennings and Hayes 1994), but if no suitable nesting habitat can be found close by, adults may travel overland considerable distances to nest. Threats to the western pond turtle include impacts to nesting habitat from agricultural and grazing activities, human development of habitat, and increased predation pressure from native and non-native predators as a result of human-induced landscape changes.

Western pond turtles have been recorded recently along a number of streams and rivers, and within a number of ponds and lakes, throughout much of the Project Area away from northern, tidal stream reaches (Figure 3.3-19) (H. T. Harvey & Associates 1999a, CNDDB 2011, unpublished SCVWD data). All perennial creeks, many intermittent creeks, and most ponds that are not completely isolated by development have some potential to support this species. However, the cumulative stressors of urbanization, including release of non-native turtles, predation and harassment by pets and non-native mammals, capture by humans, degradation of water quality, loss of upland nesting habitat because of development, and the construction of barriers between creeks and nesting areas have reduced western pond turtle populations, and few areas exist where the species can be considered common. In particular, the scarcity of suitable expanses of nesting habitat makes the maintenance of viable populations unlikely along reaches of many creeks in the Project Area. Large numbers of different-aged individuals, suggesting the presence of successfully breeding turtles, have been observed in ponds near Coyote Ranch in the northern part of Coyote Valley, since the 1990s (S. Rottenborn, pers. obs.), but observations of such healthy breeding populations are relatively scarce in the Project Area. The most recent observations in the Project Area were small numbers of

primarily older individuals, suggesting low productivity and/or survival of western pond turtles in most of the Project Area.

California Horned Lizard (*Phrynosoma blainvillii*). Federal Listing Status: None; State Listing Status: Species of Special Concern. The California horned lizard is a California endemic that is distributed along the coast from Contra Costa County in the north to San Diego County in the south, as well as in patches throughout the Central Valley. The breeding season for California horned lizards extends from April to August, after which individuals disperse to overwintering habitats where they hibernate from November through March. California horned lizards occupy a variety of open habitats characterized by sandy, loosely textured soils, such as chaparral, coastal scrub, annual grassland, and clearings in riparian woodlands. (Jennings and Hayes 1994)

Horned lizards are most strongly associated with loose soils free of plant debris, and with the presence of native harvester ants (*Pogonomyrmex barbatus*), which comprise a primary part of their diet. California horned lizard populations have declined significantly because of loss of habitat and the influx of invasive invertebrate species. (Fisher et al. 2002) The introduction of Argentine ants (*Linepithema humile*) has displaced the harvester ant in California, reducing the range of the California horned lizard.

Suitable loose-textured soils are relatively scarce, and Argentine ants are relatively common and widespread in the Project Area; therefore, the potential for California horned lizards to occur in the majority of the Project Area is extremely low. Additionally, pressure from domestic cat predation limits the populations of California horned lizards near urban areas. A single, recent record of the species exists in the Project Area, from Calero Reservoir (N. Merrill, pers. obs.) and some potential exists for the California horned lizard to occur in the Santa Teresa Hills, where the soils are more loosely textured. Locations of occurrence in the Project Area are shown in Figure 3.3-19. Potential habitat for this species also is in the vicinity of Alum Rock Park and possibly elsewhere, where suitable substrate and prey are present near the margins of the Project Area.

Black Skimmer (*Rynchops niger*). Federal Listing Status: None; State Listing Status: Species of Special Concern (Nesting Colony). The black skimmer's unique physiology, with its lower mandible longer than its upper mandible, allows this species to fly over the surface of the water, "skimming" for small fish. Nesting habitat for black skimmer occurs primarily on the coasts of the southeastern United States, the Gulf of California, and from the Pacific Coast of Baja, California, north to San Diego. In California, black skimmer is considered a species of special concern only when nesting.

Black skimmers were first detected nesting in California in 1972. Since that time, their populations in California have increased considerably, to approximately 1,200 pairs in 1995 (Collins and Garrett 1996). The black skimmer was considered a rare non-breeding visitor to the San Francisco Bay area until the mid-1990s. In 1994, one pair of black skimmers was documented nesting at saline-managed Pond AB2 in Santa Clara County, and a second pair nested at Hayward Regional Shoreline in Alameda County (Layne et al. 1996). Since 1994, black skimmers have occurred in the South Bay every year, nesting at several additional sites (Strong 2004). In the San Francisco Bay area, black skimmers typically nest among Forster's terns (*Sterna forsteri*), on small dredge-spoil islands (including both bare islands and vegetated islands, sometimes heavily vegetated with pickleweed) in saline-managed ponds. Exact nesting locations vary from year to year.

Since 1994, skimmer populations in the South Bay have slowly but steadily increased, although the extent to which this increase has resulted from local reproduction versus immigration from the increasing southern California population is unknown. In the Project Area, skimmers have bred at ponds AB1, AB2, A1, A2W, A7, A8, and A16, and Pond A12 and other managed ponds in Alviso may provide breeding and foraging habitat (Bousman 2007f). Although the species may forage in sloughs

in the Project Area, black skimmer is likely to occur infrequently in areas that would be affected by the SMP Update.

Northern Harrier (*Circus cyaneus*). Federal Listing Status: None; State Listing Status: Species of Special Concern (Nesting). The northern harrier nests in marshes and grasslands, usually those with tall vegetation and moisture sufficient to inhibit accessibility of nest sites to predators. This species forages, primarily on small mammals and birds, in a variety of open grassland, ruderal, and agricultural habitats.

Northern harrier breeds in small numbers in more extensive patches of tidal marsh habitat close to San Francisco Bay, including marshes along the lower, tidal reaches of SCVWD-maintained streams. It is possible that this species nests in tall, dense, ruderal vegetation and grassland in San Jose/Santa Clara WPCP buffer lands (i.e., the formerly cultivated grassland/ruderal habitat surrounding the WPCP, bounded by SR 2376, Zanker Road, and Los Esteros Road in Alviso) or in diked/tidal marsh habitat in Alviso. Some potential also exists for harriers to nest in fallow fields in Coyote Valley, and along lower Llagas Creek, Carnadero Creek, and the Pajaro River. However, nest accessibility to predators limits the potential for, and likely the success of, the species' nesting in the Project Area. Northern harrier forages in a variety of open habitats, especially during the non-breeding season, and the species is fairly widespread as a forager in grasslands, extensive wetlands, and agricultural areas in the Project Area during migration and winter. In some years, when vole populations are particularly high, high densities of harrier can be found in some areas (De Anza College Wildlife Corridor Steward Team 2009).

Long-eared Owl (*Asio otus*). Federal Listing Status: None; State Listing Status: Species of Special Concern (Nesting). The long-eared owl is an uncommon, year-long resident throughout much of California. It frequents dense riparian and live oak thickets near meadow edges, and nearby woodland and forest habitats, but also may be found in dense conifer stands at higher elevations. This species forages over open areas, where it hunts for rodents and small birds. It breeds from valley foothill hardwood up to ponderosa pine habitats from early March to late July. This species is considered a California species of special concern only when breeding.

No known nesting locations exist for the long-eared owl in the Project Area (Noble 2007), and the species likely occurs here only as a rare and irregular non-breeding visitor. However, the species has been recorded nesting just outside the Project Area in Ed Levin County Park, west of Calaveras Reservoir in 2001 (Noble 2007). Thus, because the long-eared owl is known to nest in a variety of wooded habitat types, it is possible that a few pairs occur in riparian, oak woodland, or mixed evergreen forest in the Project Area.

Short-eared Owl (*Asio flammeus*). Federal Listing Status: None; State Listing Status: Species of Special Concern (Nesting). Short-eared owl occurs in open habitats such as grasslands, wet meadows, and marshes. It requires tall, herbaceous vegetation for nesting or daytime refuge. Short-eared owl once bred much more widely in California, including the San Francisco Bay area. However, the species now occurs primarily as a migrant and winter visitor, and it is a rare and local breeder in the South Bay. The most recent nesting record in the South Bay was of three pairs, producing four fledglings at Bair Island in 1994 (Yee et al. 1994). Breeding-season records in the Project Area include a pair at the Palo Alto Baylands in 1966 (Chase and Chandik 1966) and two nests in the Palo Alto Flood Control Basin in 1972 (Gill 1977). A low probability exists that this species currently breeds in the Project Area, or that it would breed in the Project Area other than in the Palo Alto Flood Control Basin. During winter, the species is more widespread, although in low numbers, foraging in extensive marshes, grasslands, and agricultural areas.

Burrowing Owl (*Athene cunicularia*). Federal Listing Status: None; State Listing Status: Species of Special Concern. The burrowing owl is a small, terrestrial owl of the open country. This species prefers annual and perennial grasslands, typically with sparse or nonexistent tree or shrub canopies. In California, burrowing owls are found in close association with California ground squirrels; owls use the abandoned burrows of ground squirrels for shelter and nesting. The nesting season, as recognized by the CDFG (1995), runs from February 1 through August 31. After nesting is completed, adult owls may remain in their nesting burrows or in nearby burrows, or they may migrate (Rosenberg et al. 2007); young birds disperse across the landscape from 0.1 mile to 35 miles from their natal burrows (Rosier et al. 2006). Burrowing owl populations have declined substantially in the San Francisco Bay area in recent years, with declines estimated at 4-6 percent annually (DeSante et al. in press, in Rosenberg et al. 2007).

Burrowing owl occurs year-round in the Santa Clara Valley (Trulio 2007), and is commonly present in open, agricultural, or grassland areas with active ground squirrel burrows. Burrowing owl also exhibits strong site fidelity, and may return to a nesting site and attempt to nest even after the site has been developed. In the Project Area, particular concentrations of burrowing owls occur at the WPCP and its buffer lands, at the Santa Clara Valley Transportation Authority's Cerone operating division in the Alviso area, and at the San Jose International Airport and on undeveloped parcels east of U.S. Highway 101 near the airport. However, this species is increasingly disappearing from "infill" locations on the urban valley floor. Burrowing owl was present in the Coyote Valley and Evergreen areas in the 1990s, but it has been infrequently recorded in either area in recent years. It still occasionally is recorded in Coyote Valley and in grasslands at higher elevations, such as on Coyote Ridge, but it seems to occur in such areas primarily during the non-breeding season. SCVWD performed surveys at 41 project sites throughout Santa Clara County in summer 1998, but the District detected no burrowing owls at any of these sites, nor in potential habitats adjacent to the project sites (SCVWD 1998).

In 2007 and 2008, a habitat assessment, burrow mapping study, and standardized breeding-season, protocol surveys for the burrowing owl were conducted along sections of multiple SCVWD-managed waterways in Palo Alto, Mountain View, Sunnyvale, Santa Clara, San Jose, Alviso, Milpitas, and Gilroy (EDAW 2008). These surveys identified active breeding and overwintering burrowing owls at a few locations in or adjacent to the Project Area (Figure 3.3-21), and potential habitat for burrowing owl was determined to be present along a number of creeks in the Project Area (EDAW 2008). However, no burrowing owl was recorded using SCVWD facilities, such as levees, during either of the two surveys, and SCVWD levees did not appear to provide important burrowing owl nesting or roosting habitat (i.e., used regularly or by a sizeable proportion of the South Bay population).

Vaux's Swift (*Chaetura vauxi*). Federal Listing Status: None; State Listing Status: Species of Special Concern (Nesting). The Vaux's swift is distributed throughout the Pacific Northwest, in close association with coniferous forests (Bull and Collins 2007). In California, the range of this small neotropical migratory bird is concurrent with the range of the coast redwood, which extends along the coast from Del Norte County in the north to Monterey County in the south (Hunter 2008). Vaux's swifts also can be found in smaller numbers in other coniferous forest types across northern California and along the western slope of the Sierra Nevada (Hunter 2008). Vaux's swifts nest both in small colonies and as single pairs, occupying cavities in redwoods and other trees (Hunter and Mazurek 2003). They will use both basal cavities and holes near the tops of trees, and once they have discovered a suitable tree, they will return to reuse the site in subsequent years (Hunter and Mazurek 2003). Swifts also occasionally use artificial cavities such as chimneys (Hunter 2008). They forage on flying insects in the air above a variety of habitats and can often be seen far from the nearest suitable breeding habitat (Hunter 2008). Swifts begin breeding in early May and continue until mid-August, when most individuals migrate to southern Mexico and Central America, although small numbers overwinter as far north as central California (Bull and Collins 2007). Loss of nest and

roost sites, particularly in old-growth and other mature forests, is a primary threat to this declining species (Hunter 2008).

In the South Bay, Vaux's swifts breed primarily in snags in the forests of the Santa Cruz Mountains (Rottenborn 2007d); suitable nest trees are absent from the Project Area. However, this species also breeds in residential chimneys in the foothills of the Santa Cruz Mountains and has most commonly been observed foraging over suburban areas having chimneys suitable for nesting, such as Los Gatos, Los Altos, Los Altos Hills, Cupertino, and Campbell (Rottenborn 2007d). Thus, it likely breeds more commonly than currently recorded (though still in small numbers) in residential areas in the western part of the Project Area. Vaux's swifts are aerial foragers that forage in low numbers throughout the Project Area during migration.

Olive-sided Flycatcher (*Contopus cooperi*). Federal Listing Status: None; State Listing Status: Species of Special Concern (Nesting). In northern California, the olive-sided flycatcher is distributed along the Coast Ranges and the Sierra Nevada (Altman and Sallabanks 2000, Widdowson 2008). Olive-sided flycatchers are associated with coniferous forest habitats and breed in mature forests with open canopies, along forest edges in more densely vegetated areas, in recently burned forest habitats, and in selectively harvested landscapes (Altman and Sallabanks 2000, Robertson and Hutto 2007). Olive-sided flycatchers nest in tall trees, building an open-cup nest away from the main trunk in the middle to upper reaches of the tree (Widdowson 2008). This species makes one of the longest annual migrations of any songbird, from the Andes Mountains of South America to boreal breeding grounds in the United States and Canada. Individuals exhibit high site fidelity and arrive at their breeding territories beginning in mid-May, remaining until late July. Populations of olive-sided flycatchers are experiencing steady and steep declines throughout the range of the species, likely because of conversion of forested habitat to non-forested landscapes, and to the loss of habitat on wintering grounds (Altman and Sallabanks 2000, Widdowson 2008).

This species breeds widely in the Santa Cruz Mountains, and more sparingly in the Diablo Range, but it does not breed on the Santa Clara Valley floor. Likely, few pairs nest at sites below 1,000 feet in elevation, but confirmed breeding has occurred at elevations as low as 400 feet (Bousman 2007c). It is known to nest along Upper Penitencia Creek in Alum Rock Park, and occasionally around Calero Reservoir, in the Project Area (Bousman 2007c).

Loggerhead Shrike (*Lanius ludovicianus*). Federal Listing Status: None; State Listing Status: Species of Special Concern (Nesting). The loggerhead shrike is a predatory songbird associated with open habitats interspersed with shrubs, trees, poles, fences, or other perches from which it can hunt. Nests are built in densely foliated shrubs or trees, often containing thorns, which offer protection from predators and on which prey items are impaled. The breeding season for loggerhead shrikes may begin as early as mid-February and lasts through July. (Yosef 1996)

Nationwide, loggerhead shrike populations have declined significantly over the last 20 years. Loggerhead shrikes are still fairly common in parts of the San Francisco Bay area, but urbanization has reduced available habitat, and local populations likely are declining. Loss and degradation of breeding habitat as well as possible negative impacts of pesticides are considered to be the major contributors to the population declines exhibited by this species. (Cade and Woods 1997, Humple 2008)

Loggerhead shrike breeds in a number of locations in the Project Area, where open grassland, ruderal, or agricultural habitat with scattered brush, chaparral, or trees that provide perches and nesting sites occurs (Bousman 2007k). This species occurs slightly more widely (i.e., in smaller patches of open areas providing foraging habitat) during the non-breeding season.

Yellow Warbler (*Dendroica petechia*). Federal Listing Status: None; State Listing Status: Species of Special Concern (Nesting). The yellow warbler is a widespread neotropical migrant that inhabits wet deciduous forests throughout North America (Lowther et al. 1999). In California, yellow warbler occupies wooded riparian habitats along the coast, on both eastern and western slopes of the Sierra Nevada up to approximately 1,700 feet, and throughout the northern portion of the state (Heath 2008). Its range has remained relatively stable over time, but populations have declined substantially in many localities because of habitat loss (Cain et al. 2003, Heath 2008) and expansion of the brood-parasitic, brown-headed cowbird.. As a result, breeding yellow warbler has been largely extirpated from the Santa Clara Valley (Heath 2008). Ideal breeding habitat for yellow warbler consists of riparian corridors with dense, shrubby understory and open canopy (Lowther et al. 1999, Cain et al. 2003, Heath 2008). Yellow warbler breeds from early May through early August, and constructs open-cup nests in upright forks of shrubs or trees in dense willow thickets or other dense vegetation (Lowther et al. 1999).

Yellow warblers are uncommon breeders in the Project Area because of loss of riparian habitat, invasion by non-native plants, development along riparian corridors, and the abundance of the brown-headed cowbird in the San Jose area. However, small numbers of yellow warblers still breed in remnant riparian areas within Santa Clara County (Bousman 2007j). Suitable breeding habitat consists of riparian corridors, often with an overstory of mature cottonwoods and sycamores, a midstory of box elder and willow, and a substantial shrub understory (Bousman 2007j). Riparian areas with reduced understory because of grazing or disturbance generally are not used by this species, and riparian corridors lacking open ruderal or herbaceous vegetation along the edges of the corridors or with development up to the corridor edge often are avoided as well. This species breeds in very low numbers along the lower reaches of South Bay streams, being somewhat more common in the upper reaches of the cottonwood/willow-dominated zone. In the South County, the species has been recorded breeding in riparian habitat along Llagas, Uvas/Carnadero, and Pacheco Creeks, as well as the Pajaro River. However, bi-weekly bird surveys along lower Llagas Creek from Highway 152 downstream to the Pajaro River in 2010 did not detect any breeding evidence, and none were observed after late June (H. T. Harvey & Associates 2010c). These results suggest the possibility that South County populations continue to decline. Yellow warblers are an abundant migrant throughout the Valley during the spring and fall.

San Francisco Common Yellowthroat (*Geothlypis trichas sinuosa*). Federal Listing Status: None; State Listing Status: Species of Special Concern. The San Francisco common yellowthroat inhabits emergent vegetation and breeds in fresh and brackish marshes and moist floodplain vegetation around the San Francisco Bay. Common yellowthroat uses small and isolated patches of habitat as long as groundwater is close enough to the surface to encourage the establishment of dense stands of rushes, cattails, willows, and other emergent vegetation (Nur et al. 1997, Gardali and Evens 2008). Ideal habitat, however has extensive, thick riparian, marsh, or herbaceous floodplain vegetation in perpetually moist areas, where populations of brown-headed cowbirds are low (Menges 1998). San Francisco common yellowthroat breeds primarily in fresh and brackish marshes, although it nests in salt marsh habitats that support tall vegetation (Guzy and Ritchison 1999). This subspecies builds open-cup nests, low in the vegetation, and nests from mid-March through late July (Guzy and Ritchison 1999, Gardali and Evens 2008).

The San Francisco common yellowthroat is one of the approximately 12 subspecies of common yellowthroat recognized in North America, two of which occur in the Project Area. Because subspecies cannot be reliably distinguished in the field, determination of the presence of San Francisco common yellowthroat can be achieved only by locating breeding birds in the breeding range known for this subspecies.

In the South Bay, the San Francisco common yellowthroat is a fairly common breeder in fresh and brackish marshes in the northern part of the Project Area. It is known to breed near the edge of the

South Bay as well as in herbaceous riparian habitat and ruderal floodplain habitat along streams entering the Bay, such as lower Coyote Creek and the Guadalupe River (Bousman 2007m). Common yellowthroats breeding along the edge of the Bay and in riparian and wetland habitats away from the Bay from the Milpitas/northern San Jose/Santa Clara/Los Gatos area northward are considered San Francisco common yellowthroats, while those breeding from southern San Jose southward are of the more widespread subspecies *arizela*. The demarcation between the two subspecies apparently occurs somewhere in the mid-San Jose area (Grinnell and Miller 1944), and although those breeding in the southern part of the Project Area are certainly *arizela*, yellowthroats breeding in such areas as along Silver Creek near Lake Cunningham could be either subspecies, or could be intergrades.

Yellow-breasted Chat (*Icteria virens*). Federal Listing Status: None; State Listing Status: Species of Special Concern (Nesting). The yellow-breasted chat is a neotropical migrant that breeds throughout eastern North America and patchily throughout the west (Eckerle and Thompson 2001). Chats nest in the understory of early-successional riparian corridors and other riparian habitats with dense foliage in the understory and an open canopy (Ricketts and Ritchison 2000, Comrack 2008). Chats prefer large patches of nesting habitat (Burhans and Thomson 1999) and are more likely to fledge young in patches with very dense foliage cover and sparse canopy cover (Ricketts and Ritchison 2000). They also require some taller trees for song perches (Ricketts and Kus 2000). Thus, optimal chat habitat is characterized by large patches of riparian vegetation with a thick shrubby understory, and a few taller trees but little overall canopy cover. Chats arrive at their breeding grounds as early as mid-April, and breed through August, after which they migrate to southern Mexico and Central America for the winter (Eckerle and Thompson 2001).

Yellow-breasted chat historically has nested in riparian habitats in the Santa Clara Valley, although no evidence shows that it was ever common here. Now, the species is an extremely rare breeder because of loss of suitable breeding habitat and the presence of brown-headed cowbirds (Bousman 2007b). In recent years, chats have been recorded in the largest numbers and most regularly along lower Llagas Creek, from the vicinity of the South County Regional Wastewater Authority Plant downstream to the Pajaro River (Padley 2010, H. T. Harvey & Associates 2010c). Elsewhere, nesting has been confirmed recently in the Project Area only along Coyote Creek upstream from U.S. Highway 101 near Hellyer Park, where a family group was seen in 1995 (S. Rottenborn, pers. obs.). However, a singing male along Coyote Creek near Coyote Ranch, at the northern end of the Coyote Valley, in 2008 (De Anza College Wildlife Corridor Stewardship Team, unpublished data) may have attempted breeding, and the species may breed in small numbers elsewhere on the valley floor (e.g., along lower Uvas/Carnadero Creek, the Pajaro River, and possibly elsewhere), in willow-dominated riparian habitats.

Alameda Song Sparrow (*Melospiza melodia pusillula*). Federal Listing Status: None; State Listing Status: Species of Special Concern. The Alameda song sparrow is one of three subspecies of song sparrow that breed only in salt marsh habitats in the San Francisco Bay area (Chan and Spautz 2008). Prime habitat for Alameda song sparrow consists of large areas of tidally influenced salt marsh, dominated by cordgrass and gumplant and intersected by tidal sloughs, offering dense vegetative cover and singing perches. Although the *pusillula* subspecies (the "species" of special concern) is occasionally found in brackish marshes dominated by bulrushes, it is apparently very sedentary and is not known to disperse upstream into freshwater habitats (Basham and Mewaldt 1987). Although the range of the Alameda song sparrow has remained relatively unchanged over time, populations have been reduced substantially and are continually threatened by the loss and fragmentation of salt marshes around the Bay (Nur et al. 1997, Chan and Spautz 2008).

Song sparrow nests as early as March, but peak nesting activity probably occurs in May and June. Salt marsh-breeding song sparrow in the Bay area (including *pusillula*) is known to breed about 2 weeks earlier than *gouldii* (Johnston 1954; Johnston 1956). This early breeding by *pusillula* is apparently an

adaptation to breeding in a tidal environment, as high tides in late spring and early summer may destroy large numbers of nests.

This subspecies' primary habitat is fully tidal salt marsh, which is present in the Project Area along the South Bay (Figure 3.3-20). Song sparrow breeds along the lengths of tidal sloughs, and the demarcation along these sloughs between this subspecies and the more common, widespread subspecies *gouldii* that nests widely in freshwater habitats in the South Bay is unknown (Rottenborn 2007c).

Grasshopper Sparrow (*Ammodramus savannarum*). Federal Listing Status: None; State Listing Status: Species of Special Concern (Nesting). In California, the distribution of breeding grasshopper sparrows includes the Coast Ranges, the northern Central Valley, and areas west of the southeastern deserts (Lyon 2000, Unitt 2008). The species always has been sparsely distributed in California, and its abundance has declined over the past half-century, likely in relation to conversion of native grassland habitats to agricultural and developed lands (Sutter and Ritchison 2005, Unitt 2008). Grasshopper sparrow breeds in open, short grasslands with scattered clumps of shrubby vegetation, constructing domed ground nests with grasses in patches of dense vegetation (Vickery 1996, Sutter and Ritchison 2005, Unitt 2008). Prime grasshopper sparrow breeding habitat features very large, unfragmented areas of grassland with patches of bare ground, and clumps of shrubby vegetation surrounded by denser grass cover for singing perches and nest sites (Vickery 1996, Lyon 2000, Sutter and Ritchison 2005). Grasshopper sparrow breeds from mid-March to August in California, after which it migrates to wintering grounds that are presumed to be in Mexico and Central America (Vickery 1996, Unitt 2008).

In the Project Area, breeding grasshopper sparrow occurs in the foothills of the Santa Cruz Mountains, from Calaveras Reservoir southeast to the hills above Pacheco Creek, and in the southeast portion of the Project Area where the hills drop down to the Pajaro River Valley (Heller 2007). The species may occur somewhat more widely during migration, but it is seldom seen in the South Bay outside the breeding season.

Bryant's Savannah Sparrow (*Passerculus sandwichensis alaudinus*). Federal Listing Status: None; State Listing Status: Species of Special Concern. The Bryant's savannah sparrow is one of four subspecies of savannah sparrow that breeds in California. The *alaudinus* subspecies occurs primarily along coastal and bay shore areas, from Humboldt Bay to Morro Bay, and is found year-round in low-elevation, tidally influenced habitat, specifically pickleweed-dominated salt marshes, and in adjacent grasslands and ruderal areas. In South San Francisco Bay, levee tops with short vegetative growth and levee banks with high pickleweed are the preferred nesting habitat of this sparrow (Fitton 2008).

Bryant's savannah sparrows breed in the Project Area primarily in short pickleweed-dominated portions of diked/muted tidal salt marsh habitat, and in adjacent ruderal habitat, in the South San Francisco Bay area. Breeding also has been confirmed in expanses of short grassland in inland/upland areas on the west side of the Coyote Valley and in the Santa Cruz Mountain foothills, just north of the Pajaro River Valley (Rottenborn 2007b). During the non-breeding season, *alaudinus* and other savannah sparrow subspecies may forage in open areas throughout the Project Area.

Tricolored Blackbird (*Agelaius tricolor*). Federal Listing Status: None; State Listing Status: Species of Special Concern (Nesting Colony). Tricolored blackbirds are found primarily in the Central Valley and in central and southern coastal areas of California. This species is considered a California species of special concern (at its nesting colonies) because of concerns over the loss of wetland habitats in the state. The tricolored blackbird is highly colonial in its nesting habits and forms dense breeding colonies that, in some parts of the Central Valley, may consist of up to tens of

thousands of pairs. This species typically nests in tall, dense stands of cattails or tules, but it also nests in blackberry, wild rose bushes, and tall herbs. Nesting colonies usually are located near fresh water. Tricolored blackbirds form large, often multi-species flocks during the non-breeding period and range more widely than during the breeding season.

In the Project Area, the species is patchily distributed in the Santa Clara Valley; its distribution reflecting the patchy nature of its breeding habitat (Rottenborn 2007a). Because nesting habitat for this species is short-lived and is often created by disturbance, colonies generally are not present at a given location for more than a few years. Additionally, because tricolored blackbirds are itinerant nesters, and because their nesting habitat is ephemeral, it is possible for this species to colonize or recolonize an area as suitable breeding habitat becomes available. As a result, undocumented colonies of tricolored blackbirds may appear in the Project Area, if new areas of emergent vegetation are established (e.g., because of wetland restoration or in stormwater detention basins or other ponds that are newly constructed or modified) in areas surrounded by extensive open foraging habitat.

Salt Marsh Wandering Shrew (*Sorex vagrans halicoetes*). Federal Listing Status: None; State Listing Status: Species of Special Concern. The salt marsh wandering shrew occurs primarily in medium-high, wet tidal marsh (6 to 8 feet above mean sea level) with abundant driftwood and other debris for cover (Shellhammer 2000). This species also has been recorded in diked marsh habitat. Within these habitats, individuals typically prefer patches of tall pickleweed, in which they build nests. Salt marsh wandering shrew breeds and gives birth during the spring; however, very little is known about the natural history of this species.

The salt marsh wandering shrew historically was more widely distributed in the San Francisco Bay, but it is currently confined to salt marshes in the South Bay (Findley 1955). Salt marsh wandering shrew occasionally is captured during salt marsh harvest mouse trapping studies, but the difficulty in identifying it to species has precluded a better understanding of its current distribution in the South Bay. The shrew was formerly recorded from marshes of San Pablo and San Francisco Bays in Alameda, Contra Costa, San Francisco, San Mateo, and Santa Clara counties, but captures in recent decades have been very infrequent in these areas.

The fully tidal salt marshes in the South Bay provide high-quality habitat for the species, and salt marsh wandering shrew likely is present in these areas. The species also has been recorded in New Chicago Marsh, which contains muted tidal/diked salt marsh. Therefore, it may occur in pickleweed-dominated tidal, muted tidal, or diked salt marshes within the northern part of the Project Area, such as along the lower reaches of streams entering the Bay (Figure 3.3-22).

Pallid Bat (*Antrozous pallidus*). Federal Listing Status: None; State Listing Status: Species of Special Concern. The pallid bat is a light brown or sandy-colored, long-eared, moderate-sized bat that occurs throughout California, with the exception of the northwest corner of the state and the high Sierra Nevada (Zeiner et al. 1990b). Pallid bats are most commonly found in oak savannah and in open dry habitats with rocky areas, trees, buildings, or bridge structures that are used for roosting (Zeiner et al. 1990b, Ferguson and Azerrad 2004). Coastal colonies commonly roost in deep crevices in rocky outcroppings, in buildings, under bridges, and in the crevices, hollows, and exfoliating bark of trees. Night roosts often occur in open buildings, porches, garages, highway bridges, and mines. Colonies can range in size from a few individuals to over a hundred (Barbour and Davis 1969), and they usually consist of at least 20 individuals (Wilson and Ruff 1999). Pallid bats typically winter in canyon bottoms and riparian areas. After mating during the late fall and winter, females leave to form maternity colonies, often on ridge tops or other warmer locales (Johnston et al. 2006). Pallid bat roosts are very susceptible to human disturbance, and urban development has been cited as the most significant factor contributing to their regional decline (Miner and Stokes 2005).

Pallid bat likely was present throughout the Project Area historically, but it is slowly being extirpated from the area because of anthropogenic disturbance and habitat loss. In the Project Area, a maternity colony is present along Cochrane Road near Anderson Dam in Morgan Hill (Dave Johnston, pers. obs.). In addition, maternity colonies are present in east San Jose at a drainage south of Berryessa Creek close to Old Piedmont Road and on Chaboya Court at the end of Quimby Road; at the Highway 152 bridge over Uvas Creek west of Gilroy; and near Day Road northwest of Gilroy (Dave Johnston, pers. obs.). Individuals from these maternity roosts may forage in the Project Area, in open areas located within several miles of these roost locations. Pallid bats are known to forage along Alamitos Creek and Metcalf Road, but the locations of breeding colonies for these individuals are unknown. Potential breeding habitat is present in barns or old oak trees in a number of other areas, primarily in less developed portions of the Project Area.

Townsend's Big-eared Bat (*Corynorhinus townsendii*). Federal Listing Status: None; State Listing Status: Species of Special Concern. The Townsend's big-eared bat is a colonial species, and females aggregate in the spring at maternity colonies to begin their breeding season, which may extend through the end of August. Females give birth to one young, and females and young show a high fidelity to both their group and their specific roost site (Pearson et al. 1952). Although the Townsend's big-eared bat is usually a cave dwelling species, many colonies are found in anthropogenic structures, such as the attics of buildings or old abandoned mines. Known roost sites in California include limestone caves, lava tubes, mine tunnels, buildings, and other structures (Williams 1986). This species also roosts in deep crevices of redwood trees. Radio tracking studies suggest that movement from a colonial roost during the maternity season is confined to the area within 9 miles of the roost (Pierson and Rainey 1998). This species is easily disturbed while roosting in buildings, and females are known to abandon their young when disturbed (Humphrey and Kunz 1976). Townsend's big-eared bats feed primarily on moths and other soft-bodied insects (Kunz and Martin 1982).

Townsend's big-eared bats have been found roosting at San Cristobal mine at Almaden Quicksilver County Park and just outside the Project Area on UTC property, east of Coyote Ridge near Metcalf Road (Dave Johnston pers. obs.). Additional roosts of Townsend's big-eared bats may be present in other areas, especially where mines are present (such as the Guadalupe Mines and possibly on southern Coyote Ridge), and it is possible that large trees or abandoned buildings in relatively undisturbed areas are used as well. No populations of Townsend's big-eared bats are currently known to occur on the Santa Clara Valley floor, and this species is not expected to breed in developed portions of the Project Area. Individual Townsend's big-eared bats may occasionally wander through any portion of the Project Area, where they may roost in cavities or structures and forage in a variety of habitats, although they are expected to occur only as occasional non-breeding foragers.

Western Red Bat (*Lasiurus blossevillii*). Federal Listing Status: None; State Listing Status: Species of Special Concern. The western red bat is a locally common bat in coastal California and the Central Valley, and its range extends from Shasta County to Baja California, Mexico (Zeiner et al. 1990b). Western red bats are strongly associated with intact cottonwood and sycamore valley riparian habitats in low elevations (Pierson et al. 2006), and the loss of such habitats throughout the species' range threatens the persistence of the western red bat (Western Bat Working Group 2005). Both day and night roosts usually are located in the foliage of trees; red bats in the Central Valley show a preference for large trees and extensive, intact riparian habitat (Pierson et al. 2006). Day roosts often are located along the edges of riparian areas, near streams, grasslands, and even urban areas (Western Bat Working Group 2005). During the breeding season, western red bats establish individual tree roosts and occasionally small maternity colonies in riparian habitats (Zeiner et al. 1990b). Little is known about the habitat use of western red bats during the non-breeding season (Pierson et al. 2006). The red bat uses echolocation to capture insects in mid-flight, and requires habitat mosaics or edges that provide close access to foraging sites as well as cover for roosting (Zeiner et al. 1990b).

The Central Valley is assumed to be the primary breeding location of western red bat populations in California, and the species likely occurs in the San Francisco Bay Area only during winter and migration (Pierson et al. 2006). Western red bats are expected to be regular migrants and winter residents in the Project Area, but they are not known or expected to breed here. Individual male and female bats may occur as occasional migrants during the fall and spring or as foragers during the winter, and non-breeding individual males may occur during the summer. No breeding females occur in the Project Area during the summer. Western red bats may roost in the foliage in trees virtually anywhere throughout the Project Area, but are expected to roost primarily in wooded riparian areas.

San Francisco Dusky-footed Woodrat (*Neotoma fuscipes annectens*). Federal Listing Status: None; State Listing Status: Species of Special Concern. The San Francisco dusky-footed woodrat occurs in a variety of woodland and scrub habitats throughout the South Bay and the adjacent Central Coast Range, south to the Pajaro River in Monterey County (Hall 1981, Zeiner et al. 1990b). Woodrats prefer riparian and oak woodland forests with dense understory cover, or thick chaparral habitat (Lee and Tietje 2005). Although woodrats are locally common in many areas, habitat conversion and increased urbanization, as well as increasing populations of introduced predators, such as domestic cats, pose substantial threats to this subspecies (H. T. Harvey & Associates 2008). Dusky-footed woodrats build large, complex nests of sticks and other woody debris, which may be maintained by a series of occupants for several years (Carraway and Verts 1991). Woodrats also are very adept at making use of human-made structures, and can nest in electrical boxes, pipes, wooden pallets, and even portable storage containers. Woodrat nest densities increase with canopy density and with the presence of poison oak (Carraway and Verts 1991). Although the San Francisco dusky-footed woodrat is described as a generalist omnivore, individuals may specialize on local plants that are available for forage (Haynie et al. 2007). The breeding season for dusky-footed woodrat begins in February and sometimes continues through September, with females bearing a single brood of one to four young per year (Carraway and Verts 1991).

Because dusky-footed woodrats are extremely sensitive to non-native predators, their distribution in the mostly-urban Project Area is limited. Currently, with the exception of records along the northern portion of Coyote Creek and along the edges of the valley, San Francisco dusky-footed woodrats do not occur on the Santa Clara Valley floor (H. T. Harvey & Associates 2010c). They likely also have been extirpated in the southern portion of the county, in the Gilroy and Morgan Hill areas where the valley floor is developed (H. T. Harvey & Associates 2010c). Where low, open valleys are less developed (e.g., Coyote Valley and along Little Arthur Creek), woodrat populations appear to remain intact. In the Project Area, Coyote Creek likely supports extant populations of the San Francisco dusky-footed woodrat.

American Badger (*Taxidea taxus*). Federal Listing Status: None; State Listing Status: Species of Special Concern. American badger is a stocky, burrowing mammal that occurs in grassland habitats throughout the western United States. Badgers can have large territories, up to 21,000 acres in size, with territory size varying by sex and by season. They are strong diggers and feed primarily on other burrowing mammals, such as ground squirrels. In central California, American badgers typically occur in annual grasslands, oak woodland savannas, semi-arid shrub/scrublands, and any habitats with stable ground squirrel populations or other fossorial rodents (i.e., ground squirrels, gophers, kangaroo rats, and chipmunks [Zeiner et al. 1990b]). They occur to a lesser extent in agricultural areas, where intensive cultivation inhibits den establishment and reduces prey abundance. Badgers are primarily nocturnal, although they are often active during the day. They breed during late summer, and females give birth to a litter of young the following spring.

Badgers are known to occur in the Project Area primarily in foothill grasslands. In addition, road-killed animals have been detected in recent years by H. T. Harvey & Associates biologists along Monterey Highway near Tulare Hill and north of Morgan Hill; along Bailey Avenue (in Coyote Valley) at U.S. Highway 101 and west of Monterey Highway; along McKean Road near Calero Reservoir; and

along U.S. Highway 101 from Metcalf Road south to Bailey Road, in San Martin, and near the Pajaro River. These records indicate that badgers occur on the valley floor as well, most likely during dispersal events.

State Fully Protected Species

American Peregrine Falcon (*Falco peregrinus anatum*). Federal Listing Status: None; State Listing Status: Fully Protected. The American peregrine falcon occurs throughout much of the world and is known as one of the fastest flying birds of prey. Peregrine falcons prey almost entirely on birds, which they kill while in flight. These falcons nest on ledges and caves on steep cliffs, as well as on human-made structures such as buildings, bridges, and electrical transmission towers. In California, they are known to nest along the entire coastline, the northern Coast, and the Cascade Ranges and Sierra Nevada.

A severe decline in populations of the widespread North American subspecies *anatum* began in the late 1940s. This decline was attributed to the accumulation of DDE, a metabolite of the organochlorine pesticide DDT, in aquatic food chains. When concentrated in the bodies of predatory birds such as the peregrine falcon, this contaminant led to reproductive effects, such as the thinning of eggshells. The American peregrine falcon was listed as endangered by the USFWS in 1970 (USFWS 1970) and by California in 1971. Recovery efforts included the banning of DDT in North America and captive breeding programs to help bolster populations. The USFWS removed the American peregrine falcon from the endangered species list in 1999 (USFWS 1999a), and although California still lists the species as endangered, delisting under the CESA also has been proposed (California Fish and Game Commission 2007).

The only locations within the Project Area where peregrine falcons have been detected breeding are on San Jose City Hall, where successful nesting has occurred each year since 2007 (Santa Cruz Predatory Bird Research Group 2010), and in old raven and hawk nests on electrical transmission towers within managed ponds in the Mountain View/Alviso area. Although no suitable cliff habitats are present in the Project Area, buildings and transmission towers provide potentially suitable nest sites. Because of the recent increases in this species' populations in California, this species' distribution and abundance as a breeder in the Project Area possibly will expand during the span of the Proposed Project. Small numbers of peregrine falcons regularly forage in bayside areas, in Coyote Valley, and in the Pajaro River valley, particularly during the non-breeding season, and they are occasional foragers at other locations throughout the Project Area.

Golden Eagle (*Aquila chrysaetos*). Federal Listing Status: None; State Listing Status: Fully Protected. In California, the golden eagle is an uncommon permanent resident and migrant throughout the state. The species' breeding range within California excludes only the Central Valley, the immediate coast in the far north, and the southeastern corner of the state (Zeiner et al. 1990a). Recent declines of golden eagle populations have occurred in several western states in North America, including California, primarily because of loss of habitat and mortalities resulting from human activities (Kochert et al. 2002, Good et al. 2007). Further declines in eagle populations are expected to occur as long as habitat loss and anthropogenic landscape alteration continue (Good et al. 2007).

Golden eagle breeds in a range of open habitats, including desert scrub, foothill cismontane woodlands, and annual or perennial grasslands (Zeiner et al. 1990a, Kochert et al. 2002). Golden eagle nesting habitat is characterized by large, remote patches of grassland or open woodland; a hilly topography that generates lift; an abundance of small mammal prey; and tall structures that serve as nest platforms and hunting perches (Kochert et al. 2002). Once a breeding pair establishes a territory, they may build a number of nests in tall structures such as tall trees or snags, cliffs, or utility towers (Zeiner et al. 1990a, Kochert et al. 2002), only one of which is used in any given year

(Kochert et al. 2002). The eagle breeding season begins in late January and continues through August (CDFG 2008a). Following the nesting period, adult eagles usually remain in or near their breeding territory (Zeiner et al. 1990a). Young birds in California tend to be sedentary, remaining in or near their parental home ranges (Kochert et al. 2002).

In the South Bay, golden eagle breeds widely in the Diablo Range, and less commonly in the Santa Cruz Mountains (Bousman 2007l), primarily outside the Project Area; however, valley floor areas adjacent to the foothills may be used (e.g., Coyote Valley and southern Santa Clara Valley), and grasslands along the San Francisco Bay margin, where perches are available, may be used for foraging. Nesting pairs within the Project Area are expected to occur primarily in the foothills of the Diablo Range and Santa Cruz Mountains. Nesting on the valley floor occurs more rarely, although a pair has nested on an electrical tower below Calero Reservoir for a number of years, and another pair has nested in a residential backyard in western Morgan Hill (S. Rottenborn, pers. obs.).

White-tailed Kite (*Elanus leucurus*). Federal Listing Status: None; State Listing Status: Fully Protected. In California, white-tailed kites can be found in the Central Valley and along the coast, in grasslands, agricultural fields, cismontane woodlands, and other open habitats (Zeiner et al. 1990a, Dunk 1995, Erichsen et al. 1996). White-tailed kites are year-round residents of the state, establishing breeding territories that encompass open areas with healthy prey populations, and snags, shrubs, trees, or other nesting substrates (Dunk 1995). Non-breeding birds typically remain in the same area over the winter, although some movements do occur (Zeiner 1990a). The presence of white-tailed kites is closely tied to the presence of prey species, particularly voles, and prey base may be the most important factor in determining habitat quality for white-tailed kites (Dunk and Cooper 1994, Skonieczny and Dunk 1997). Although the species recovered after population declines during the early twentieth century, its populations may be exhibiting new declines as a result of recent increases in habitat loss and disturbance (Dunk 1995, Erichsen et al. 1996).

White-tailed kites are fairly common residents in less developed portions of the Project Area that contain extensive open grassland, ruderal, or agricultural habitats. They breed across the northern edge of Santa Clara County, from the foothills of the Santa Cruz Mountains near Palo Alto, through the open areas edging the South Bay, and into the foothills of the Diablo Range east of Milpitas (Mammoser 2007). The species also occurs at scattered locations southward along the western edge of the Diablo Range bordering the Santa Clara Valley (Mammoser 2007). From the Santa Teresa Hills south to the Pajaro River, white-tailed kites breed throughout the foothills of the Santa Cruz Mountains and in a few areas of the valley floor (Mammoser 2007).

Ringtail (*Bassariscus astutus*). Federal Listing Status: None; State Listing Status: Fully Protected. The ringtail is distributed throughout much of California, occurring in forests and shrubland, often in close association with rocky areas or riparian habitats. This species nests in rock recesses, hollow trees, logs, snags, abandoned burrows, or woodrat nests; young are usually born between May and June (Walker et al. 1968).

The status of this species in Santa Clara County is not well known. Although this species' strictly nocturnal habits may be at least partially responsible for the lack of information on its distribution in the Project Area, it is likely very rare because of the lack of sightings and the scarcity of roadkill records (e.g., compared to the nocturnal American badger, which is much more frequently detected by roadkill).However, ringtails have been recorded near Lexington Reservoir and near Little Arthur Creek west of Gilroy (D. Johnston, pers. comm.), and near the confluence of Carnadero Creek and the Pajaro River, and it is likely that ringtails are present in small numbers in less developed, wooded areas elsewhere at the edges of the Project Area.

Other Special-Status Species

Mimic Tryonia (*Tryonia imitator*). Federal Listing Status: None; State Listing Status: None. Also known as the California brackish water snail, this species inhabits coastal lagoons, estuaries, and salt marshes from Sonoma County south to San Diego County (CNDDB 2011). It is found in permanently submerged areas in a variety of sediment types and is able to withstand a wide range of salinities. This species has been recorded in two locations in Santa Clara County, both in the Project Area in Alviso (CNDDB 2011); one of these occurrences was from a salt evaporation pond on the east side of the Alviso Slough mouth, but the details of the other occurrence were not listed by the CNDDB. The mimic tryonia potentially may occur in tidal sloughs elsewhere in the Project Area as well.

Hom's Micro-blind Harvestman (*Microcina homi*). Federal Listing Status: None; State Listing Status: None. The Hom's micro-blind harvestman is a member of the family *Phalangodidae*, arachnids that are characterized by simple paired claws on their terminal segments. Harvestman typically has unusually long and thin legs in relation to its small, oval-shaped body.

Hom's micro-blind harvestman is endemic to the San Francisco Bay Area and highly restricted in its range. It has been observed or collected during fall and winter rains at eight sites in Santa Clara County (USFWS 1998b). With one exception, the species has been found underneath rocks with moist surfaces, on deep serpentine soil with fairly gentle slopes, often near running water (USFWS 1998b). However, in Santa Teresa Park, the species was found under Franciscan sandstone (USFWS 1998b). In the Project Area, it has been observed in the Santa Teresa Hills, the Morgan Hill area, north of U.S. Highway 101 on Metcalf Road, and near Silver Creek Road (CNDDB 2011). It potentially may occur in other locations in the Project Area as well, especially on serpentine-dominated areas with shallow soils and rock outcrops.

Jung's Micro-blind Harvestman (*Microcina jungi*). Federal Listing Status: None; State Listing Status: None. The Jung's micro-blind harvestman also is a member of the family Phalangodidae. Jung's micro-blind harvestman is known only from one rocky serpentine grassland location, 0.9 mile south of the junction of Silver Creek and San Felipe roads near San Jose. It potentially may occur in other locations in the Project Area as well, especially on serpentine-dominated areas with shallow soils and rock outcrops.

Opler's Longhorn Moth (*Adela oplerella*). Federal Listing Status: None; State Listing Status: None. Opler's longhorn moth is a small, dark brown, hairy moth with a wingspan of approximately 0.35 to 0.55 inches. Adults almost always are found within a few yards of their host plant, California creamcups. Within this constraint, they are fairly commonly found on potential nectar plants, such as goldfields (*Lasthernia* sp.), tidy tips (*Layia* sp.), and Linanthus (*Linanthus* sp.), although the importance of nectar, if any, for survival and reproduction is unknown (USFWS 1998b). Individuals complete the active portion of their life cycle in a single season, the winter–spring wet season. At any one population, the flight season may last only 2 or 3 weeks (USFWS 1998b). Adults fly, mate, and female's lay their eggs generally from mid-March to late April, although the exact timing varies from year to year, depending on the weather (USFWS 1998b). Females insert their eggs directly into the unopened flowers of California creamcups. Survival through the dry season is accomplished by prepupal larvae or pupae in larval cases (USFWS 1998b). Available data indicates that Opler's longhorn moths are not strong fliers, with one study recapturing 95 percent of marked and recaptured moths within 164 feet of their initial release point (USFWS 1998b).

Habitat for the Opler's longhorn moth includes shallow, serpentine-derived or similar soils that support the moth's host plant, as well as potential nectar sources for adults. However, the presence of a population on non-serpentine soils in Santa Cruz County suggests that this species is not a serpentine obligate (USFWS 1998b). Historically, the Opler's longhorn moth's range is believed to have included serpentine and possibly non-serpentine grassland from most of the greater San

Francisco Bay area counties. More recently, the species has been recorded from 14 sites, extending along the west side of San Francisco Bay from 5 miles southeast of Nicasio in Marin County south to the Scott's Valley area of Santa Cruz County, and also from the Oakland Hills area on the inner Coast Ranges (USFWS 1998b). Nine populations of Opler's longhorn moth have been recorded in Santa Clara County, all in the Project Area (USFWS 1998b). The species is known from serpentine habitat along Coyote Ridge, the Kalana Hills, the Hale property northwest of Morgan Hill, Tulare Hill southeast of San Jose, Silver Creek Hills in upper Hellyer Canyon, east of the Hayes Valley near San Martin, Santa Teresa County Park west of Calero Reservoir, and just north of Gavilan College south of Gilroy (USFWS 1998b, CNDDB 2011). It potentially may occur in other locations in the Project Area as well, especially on serpentine-dominated grasslands.

Pacific Lamprey (*Lampetra tridentata*). Federal Listing Status: None; State Listing Status: None. The Pacific lamprey is a member of the family *Petrornyzontidae*, a group of eel-like fish that do not possess jaws or paired fins. This species' range extends from Hokkaido, in northern Japan, across the Pacific Ocean to Alaska, and south along the coast to Baja California, Mexico (USFWS 2004b). Lampreys are born in fresh water, and larvae (or ammocoetes) hatch and drift downstream where they act as filter feeders for 2 to 7 years (USFWS 2004b). Ammocoetes gradually mature to the adult phase, and in streams that run to the ocean, adults migrate to saltwater habitat (USFWS 2004b). Adults are parasitic and feed on marine fish for 1–3 years before returning to fresh water (USFWS 2004b). The species' fidelity to natal streams is unknown, but adults may spend several years in streams before spawning (USFWS 2004b). Spawning habitat consists of gravel-bottomed streams at the upstream end of riffle habitat, typically also upstream of suitable ammocoete habitat (USFWS 2004b). Adults construct nests and deposit eggs between March and July (USFWS 2004b). Threats to this species include degraded water quality, construction of artificial barriers that prevent migration of anadromous populations to and from breeding habitat, harvest by fishing, predation by non-native species, and habitat loss (USFWS 2004b).

Historically, the Pacific lamprey may have been present in streams throughout the Project Area (Leidy 2007). It is currently known to occur in the Project Area in the Guadalupe River and Guadalupe, Alamitos, Calero, Los Gatos, Coyote, and Upper Penitencia Creeks, and may be locally common in these areas (Leidy 2007, SCVWD fish sampling and relocation data 2002-2009). As with other anadromous fishes, the Pacific lamprey may be present in all accessible areas of streams in the Project Area during migration to breeding areas, as well as during the latter portion of the adult phase of their lives, when they return to freshwater streams.

Pacific Harbor Seal *(Phoca vitulina richardsi*). Federal Listing Status: None; State Listing Status: None. Pacific harbor seals occur along the Pacific coast of North America, from Alaska south to Baja California, Mexico. In the San Francisco Bay, harbor seals haul out at sites that typically consist of mudflats located far from areas used regularly by humans, and near deeper water where the seals forage. Haul-out sites are used for resting and pupping (giving birth); pupping typically occurs during spring, with a peak in April (Fancher and Alcorn 1982). Harbor seals forage in nearshore marine habitats on a variety of fishes and invertebrates. The major harbor seal dietary components in the South Bay include yellowfin goby (*Acanthogobius flavimanus*), staghorn sculpin (*Leptocottus armatus*), and white croaker (*Genyonemus lineatus*) (Kopec and Harvey 1995).

During the spring, female harbor seals nurse pups for about 28 days, during which time they are susceptible to being separated from their young as a result of human disturbance. Disturbance can lead to separation of pups from nursing mothers, can add physiological stress to adults, and can lead to long-term abandonment of historic haul-out sites (Lidicker and Ainley 2000). The NMFS (the agency that oversees the protection of marine mammals) recommends a 100-yard disturbance-free buffer around harbor seals. Although it is not listed by California as a species of special concern or covered by the draft Habitat Plan (ICF Jones & Stokes 2010), Pacific harbor seal is protected under the federal Marine Mammal Protection Act.

Any undisturbed intertidal habitat that is accessible to the open Bay potentially may be used by harbor seals (Lidicker and Ainley 2000). A known, primary haul-out site for harbor seals in the South Bay is present just north of the Project Area at Mowry Slough in Fremont. Additional haul-out sites and foraging habitat for harbor seals are present in the intertidal habitat and mud flats elsewhere in the vicinity of the Project Area, and harbor seals are known to forage in tidal reaches of a number of the streams entering the Bay in the Project Area.

Appendix J
PESTICIDE REGULATORY INFORMATION

Introduction

Pesticides are one tool for pest control on SCVWD properties and facilities. The most common pesticide use is herbicide application to manage vegetation. Insecticides and rodenticides are also used, though less frequently and in smaller quantities than herbicides.

A variety of information sources is available to instruct the SCVWD in its choice of pesticides, and SCVWD staff routinely review new and changed pesticide formulations and changed label limitations. New products are selected and old products are discontinued because of the changing availability and suitability of the products for SCVWD use. As new technologies and chemistry become available, SCVWD evaluates its program and adopts materials that achieve optimum control while affording the best protection to environmental resources. To this end, the SCVWD has developed a series of quality and environmental management system documents, including–Q751D02, *Control and Oversight of Pesticide Use*, and WW75100, *Vegetation Control Work Instructions*, which define the process for evaluating pesticide use and making modifications to the pesticide program.

The process includes an annual meeting of the SCVWD's Pesticide Review Team to: evaluate the SCVWD's pesticide use; revise the list of pesticide products approved for use by the SCVWD, as needed; respond to issues relative to the use of pesticides; recommend changes to the pesticide program, including training and procedures; review, evaluate, and approve the use of new products, including those to be used by contractors and permittees; and research alternatives to pesticides. Furthermore, all SCVWD staff members who use or supervise the use of pesticides in the course of their duties receive annual training that provides: a review of applicable laws and regulations, an update on new products, a review of proper procedures for use and handling, a review of pesticide impacts on the environment, and label/material safety data sheet training.

The SCVWD uses a surfactant to enhance the performance of herbicides. Surfactants aid the ability of an herbicide to penetrate the surface of vegetation by increasing its ability to spread over vegetation, stick to foliage, and penetrate thick cuticles. Most aquatic herbicides either require or highly recommend the use of a surfactant to achieve reasonable levels of control. In instances where surfactants are absent from the tank mix, the level of control often is reduced. A reduction in control causes a greater return frequency, which translates to more herbicide being used in the system and more frequent disturbance to the site.

Table J-1 lists the pesticides proposed for use for the SMP Update, with their intended use.

Table J-1. Pesticides Proposed for Use

Pesticide	Type	Use
2-Phenethyl Propionate	Insecticide	Used for spray near structures for worker safety.
Aminopyralid[1]	Herbicide	Post and some pre emergent control of broadleaf weed on levee slopes firebreaks and maintenance roads—upland use.
Clopyralid	Post-emergent Herbicide	Post-emergent, selective to specific broadleaf families. Some minor pre-emergent activity. Used for control of yellow star-thistle on levee slopes/upland parcels.
Glyphosate	Post-emergent Herbicide	Post-emergent, nonselective. Approved for aquatic use. Used in channels. Roundup used in upland areas on maintenance roads/firebreaks. Cut-stump treatments for woody vegetation.
Imazapyr[1]	Post-emergent Herbicide	Broad spectrum herbicide used for upland and aquatic applications (Invasive Spartina Program). Especially effective on monocots and superior to glyphosate because of quicker drying time, lower spray volumes, and use in estuarine environments. Used for control of emergent and floating aquatic vegetation.
Isoxaben	Pre-emergent Herbicide	Pre-emergent, selective to broadleaf weeds. Used on levee slopes and maintenance roads.
Pendimethalin	Pre-emergent Herbicide	Pre-emergent, selective to grasses. Used on access roads/firebreaks.
Triclopyr	Post-emergent Herbicide	Post-emergent, selective to broadleaf weeds. Used on levee slopes. Cut-stump treatments for woody vegetation.
Chlorophacinone	Rodenticide	Used for ground squirrel control along levees, canals, and stream banks.
Diphacinone[1]	Rodenticide	Used for ground squirrel control along levees, canals, and stream banks.
Strychnine	Rodenticide	Used for gopher control only along levees, canals, and stream banks. Limited to underground application.
Dialkyl Polyoxyethylene glycol	Surfactant	Non-ionic surfactant designed for aquatic applications. Used as an additive with aquatically labeled pesticides.
Zinc phosphide[1]	Rodenticide	Used for ground squirrel control along levees, canals, and stream banks.
Aluminum phosphide[1]	Rodenticide	Used as a fumigant for burrowing rodents along levees, canals, and stream banks.

1 Not analyzed in the 2002 SMP FEIR.

Source: Data compiled by Horizon Water and Environment in 2011

In general, aquatic species (e.g., fish and amphibians) are more susceptible to adverse effects than terrestrial wildlife because of the potential for surfactants to alter cell permeability, thus increasing the potential for absorption of chemicals through their thin, moist skin. Some surfactants, particularly those that are nonylphenol-based, have been documented to result in chemical-induced lethargy and unconsciousness in fish, which can result in an increased risk of predation as well as cause estrogenic effects (Smith et al. 2004, USFS 2007). However, SCVWD proposes to limit surfactant use to the products that are documented to have the least toxic affect to aquatic life, Agri-dex and Competitor. Both of these surfactants are oil-based (Competitor is vegetable oil-based, while the primary ingredient in Agri-dex is a paraffin-based oil) and function by increasing the absorption

of herbicides through plant tissues. They are especially useful in increasing the penetration of herbicides through the bark of woody brush or tree stems (Bakke 2007). A study on the toxicity of surfactants to juvenile rainbow trout concluded that Agri-dex was less toxic to rainbow trout than two other commonly used surfactants, R-11 and LI 700 (Smith et al. 2004), and the *2006 Supplemental Environmental Assessment of NOAA Fisheries Implementation Plan for the Community Based Restoration Program* (NOAA 2006) concluded that Agri-dex was among the surfactants least toxic to marine and aquatic organisms.

Regulatory Setting

All pesticides used by the SCVWD are subject to regulation by federal and state agencies. The applicable state and federal laws are discussed next.

Federal Regulations

Federal regulation takes place under the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA), amended by the Federal Environmental Pesticide Control Act, both which are implemented by the U.S. Environmental Protection Agency (USEPA). These acts prohibit the use of a pesticide that is inconsistent with the label and requires that all pesticides be registered with USEPA.

The process of registering a pesticide is a procedure through which USEPA examines the ingredients of the pesticide in the context of the particular site or crop on which it is to be used; the amount, frequency, and timing of its use; and storage and disposal practices to determine whether a pesticide has the potential to cause adverse effects on humans, wildlife, fish, and plants, as well as the potential to contaminate surface water or ground water supplies. USEPA also must approve the language that appears on each pesticide label. A pesticide product only can be used legally, according to the directions on the labeling that accompany it at the time of sale (unless later modified by periodic label updates).

USEPA's core pesticide risk assessment and regulatory processes ensure that protection is in place for all populations of non-target species. Furthermore, because endangered species may need specific protection, USEPA has developed risk assessment procedures to determine whether individuals of a listed species have the potential to be harmed by a pesticide and, if so, what specific protection may be appropriate.

USEPA established the Endangered Species Protection Program (ESPP) in 1988, to carry out its responsibilities under FIFRA in compliance with the Endangered Species Act (ESA), while at the same time not placing an unnecessary burden on agriculture and other pesticide users. Under this program, USEPA developed county bulletins that contained recommended (i.e., voluntary) pesticide use limitations, based on consultations with the U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS), also referred together hereafter as "Services."

USEPA published its final approach to field implementation of the ESPP on November 2, 2005, making it an enforceable program under FIFRA. Under the ESPP, USEPA conducts a thorough ecological risk assessment to determine the potential risks that a pesticide may pose to a listed species and any designated critical habitat for the species. This assessment results in an "effects determination."

An assessment to determine potential effects of a pesticide's registration to a listed species results in one of two determinations:

- the pesticide's registered use will have "no effect" on the species; or

- the pesticide's registered use "may affect" the species.

If USEPA determines the pesticide "may affect" the species, it refines its assessment to determine whether the pesticide's use:

- "may affect, but is not likely to adversely affect" the species; or
- "may affect and is likely to adversely affect" the species.

A determination that the pesticide "may affect, but is not likely to adversely affect," is made where the effects on the listed species are expected to be discountable, or insignificant, or completely beneficial; terms which the USFWS has discussed in guidance as including effects extremely unlikely to occur, which cannot be evaluated, would never reach a scale where take would occur, or are wholly beneficial.

If USEPA determines that a pesticide will have "no effect" on a listed species, no further action is required relative to the pesticide's registration, label, or use instructions.

If USEPA determines that a pesticide's use "may affect, but is not likely to adversely affect" a listed species, the agency engages the Services in a process called informal consultation. The result of this process is typically a letter of concurrence or non-concurrence from the Services with USEPA's determination.

If the Services do not concur with USEPA's determination that a pesticide's registered use is "not likely to adversely affect" a species, or if USEPA determines that the pesticide "may affect and is likely to adversely affect" a listed species, it will engage the Services in a process called formal consultation.

During formal consultation, USEPA provides the Services with its detailed assessment of potential risks and its effects determination for a given pesticide. The Services review that information and evaluate it in light of the status and needs of the listed species potentially affected. The Services then generally provide USEPA with a Biological Opinion, which contains the Services assessment and recommendations for steps that USEPA should take, if any, to reduce or eliminate potential risk to the species.

The Services' Biological Opinion provides the Services' view of whether the pesticide's registered use is likely to jeopardize the continued existence of the species and, if so, describes alternatives to avoid jeopardy. The Services also authorize any "take" (unintended injury or killing of individual listed animals) that would otherwise be prohibited, as long as measures to minimize take are implemented.

If, at the conclusion of this process, USEPA determines that a pesticide's registration, label, or use instructions should be altered to ensure that use of a pesticide would not take or jeopardize the continued existence of a listed species, USEPA may require changes to the use conditions specified on the label of the product. When such changes are necessary only in specific geographic areas rather than nationwide to ensure protection of the listed species, USEPA implements these changes through geographically-specific Endangered Species Protection Bulletins. Although the original, voluntary county bulletins remain available on USEPA's Web site for use by pesticide applicators, they are not legally enforceable pesticide use limitations. However, the use limitations contained in these new bulletins are mandatory and legally enforceable.

State Regulations

California, through its Department of Food and Agriculture, further restricts pesticide use by restrictions carried on the pesticide label. California also requires that a pesticide recommendation be prepared by a State-licensed pest control advisor (PCA). The PCA must evaluate the pest control needs and determine the appropriate pesticide to be used, if any, the rate and method of application and, in general, assure that the use is consistent with the label. Furthermore, the State sets training and licensing requirements for personnel applying or supervising application of pesticides.

Federal Court Injunctions

In addition to the federal and state regulations, pesticide use in the Project Area is subject to the following two federal court-ordered injunctions, based on information provided on USEPA's Web site (http://www.epa.gov/pesticides/). These injunctions would not apply to the Proposed Project if SCVWD obtains approval of take resulting from pesticide use from the USFWS and NMFS during SMP Update-specific Section 7 consultation.

Injunction 1: Center for Biological Diversity vs. USEPA (Case No. 02-1580-JSW [JL])

On October 20, 2006, the Federal District Court for the Northern District of California issued a Stipulated Injunction that resolved a case brought against USEPA by the Center for Biological Diversity. The court's injunction put in place buffer areas around certain habitats of the California red-legged frog (including habitat in the Project Area) that disallows use of certain pesticides within those habitats and buffer zones, including the following pesticides that are proposed for use by SCVWD:

- glyphosate
- imazapyr
- pendimethalin
- strychnine
- triclopyr

The injunction disallows pesticide use only within and around certain geographic areas designated by the USFWS as critical habitat, and specified non-critical habitat "sections," including areas within Santa Clara County (Figure J-1). For the purposes of this injunction, habitat types are defined as follows:

- **Aquatic breeding critical habitat.** Standing bodies of fresh water (salinity less than 7.0 parts per thousand) including: natural and human-made (e.g., stock) ponds, slow-moving streams or pools within streams, other ephemeral or permanent water bodies that typically become inundated during winter rains and hold water for a minimum of 20 weeks in all but the driest years.
- **Non-breeding aquatic critical habitat.** Fresh water habitats that may or may not hold water long enough for the frog to complete its lifecycle but that provide for shelter, foraging, predator avoidance, and aquatic dispersal. Wetland habitats that meet these elements include, but are not limited to plunge pools within intermittent creeks, seeps, quiet water refugia during high water flows, and springs of sufficient flow to withstand summer dry periods.
- **Upland critical habitat.** Upland areas within 200 feet of the edge of riparian vegetation or dripline surrounding aquatic and riparian habitat and comprised of vegetation such as grasslands, woodlands, and/or wetland/riparian plant species that provides shelter, forage, and predator avoidance for the frog. The habitat can include natural features, such as

boulders, rocks, organic debris, small mammal burrow, and moist leaf litter or human-made features such as industrial debris and agricultural features.

- **Aquatic features.** Fresh-water habitats in or near lowlands or foothills with dense, shrubby, or emergent vegetation. Such areas include natural or human-made (e.g., stock) ponds, slow-moving streams or pools within streams, and other ephemeral or permanent waterbodies that typically become inundated during winter rains, such as plunge pools, intermittent creeks, seeps, and quiet water refugia. Such areas do not include those areas not otherwise meeting the definition of aquatic breeding habitat and non-breeding aquatic habitat.
- **Upland habitats.** All areas that are both within 200 feet of the mean high-water mark of an aquatic feature and meet the definition of upland habitat as it applies to critical habitat.

Standard buffers apply as follows:

- Within the general critical habitat areas shown on county maps—All areas described by the USFWS non-breeding aquatic critical habitat or upland critical habitat for the California red-legged frog, and in buffer zones (60 feet for ground application or 200 feet for aerial applications) measured from the edge of the aquatic breeding, non-breeding aquatic, or upland critical habitat; or
- Within non-critical habitat sections shown on county maps—All upland habitats and buffer zones (60 feet for ground application or 200 feet for aerial applications) measured from the edge of the aquatic feature or upland habitat.

However, some pesticide uses are exempt from the court's injunction or have exceptions associated with them, as described next.

Exceptions Resulting in Reduced Buffer Areas. If the proposed pesticide use is covered under one or more of the following, then a reduced buffer area is applicable:

- Use of 1,3-dichloropropene (telone) and chloropicrin
- Localized spot treatments using handheld devices on rights-of-way, roadsides, pastures, lawns, or in forests
- Spot treatments of wasp and hornet nests
- Individual tree removal using cut stump application
- Basal bark application to individual plants
- Use of the pesticides in bait stations

Under these circumstances, the covered pesticides may not be used within 60 feet of aquatic breeding critical habitat or non-breeding aquatic critical habitat within the critical habitat areas (shown on county maps) or within 60 feet of aquatic features within the non-critical habitat sections subject to the injunction. Proposed Project activities that met any of these criteria would be subject to the reduced buffer width.

Figure J-1. Potential California Red-Legged Frog Habitat Subject to the Pesticide Injunction

Exceptions for ESA-Approved Use. If the proposed pesticide use is permissible under one or more of the following, the injunction does not apply:

- A "no jeopardy" biological opinion issued under ESA Section 7(a)(2) by the USFWS and that biological opinion addresses the use of the pesticide and effects on the California red-legged frog, provided that such use is consistent with any incidental take statement included with the USFWS biological opinion.
- A "reasonable and prudent alternative" identified in a "jeopardy" biological opinion, issued under ESA Section 7(a)(2) by the USFWS that addresses the use of the pesticide and effect on the California red-legged frog, provided that such use is consistent with the "reasonable and prudent alternative" and any incidental take statement included with the Service's biological opinion.
- A written concurrence by the USFWS in a "not likely to adversely affect" determination, made under ESA Section 7(a)(2) that addresses the use of the pesticide and effects on the California red-legged frog.
- An incidental take permit issued by the USFWS under ESA Section 10(a) that authorizes the take of the California red-legged frog from application or use of the pesticide.
- Completion of a "not likely to adversely affect" determination made by an action agency to satisfy its ESA Section 7(a)(2) consultation obligation for a particular use of a pesticide, pursuant to the applicable regulations in effect at the time that the determination is made.

Exceptions for Invasive Species and Noxious Weed Programs. The injunction generally applies to invasive species and noxious weed control. However, the injunction does not apply if <u>all</u> of the following conditions are met:

- One is applying a pesticide for purposes of controlling state-designated invasive species and noxious weeds under a program administered by a public entity; and
- One does not apply the pesticide within 15 feet of aquatic breeding critical habitat or non-breeding aquatic critical habitat within critical habitat areas, or within 15 feet of aquatic features within non-critical habitat sections subject to the injunction; and
- Application is limited to localized spot treatment using hand-held devices; and
- Precipitation is not occurring or forecast to occur within 24 hours; and
- One is a certified applicator or working under the direct supervision of a certified applicator; and
- If using 2,4-D or triclopyr, one uses only the amine formulations.

<u>Injunction 2: Center for Biological Diversity vs. USEPA (Case No.07-2794-JCS [N.D. Cal]))</u>

On May 30, 2007, the Center for Biological Diversity filed a lawsuit in the U.S. District Court for the Northern District of California, alleging that USEPA failed to comply with Section 7(a)(2) of the ESA in regard to 47 pesticides and 11 species that are listed as endangered or threatened under the ESA. Ultimately, 75 pesticides came to be at issue in this case, including the following pesticides proposed for use by the Proposed Project:

- Aluminum phosphide (rodenticide)
- Chlorophacinone (rodenticide)
- Diphacinone (rodenticide)
- Pendamethalin (herbicide)

- Strychnine (rodenticide)
- Zinc phosphide (rodenticide)

The federal government agreed to a Stipulated Injunction to resolve the lawsuit. The Stipulated Injunction sets forth a schedule by which USEPA will review the registrations of pesticides containing any of 75 pesticide active ingredients for their potential effects to one or more of 11 federally listed threatened or endangered species in eight counties around the San Francisco Bay area. The injunction also identifies interim pesticide use limitations intended to reduce exposure to the 11 species during the time USEPA is assessing these pesticides and consulting with the USFWS, as appropriate.

The species identified in the lawsuit and relevant to the Proposed Project are:

- Bay checkerspot butterfly
- California clapper rail
- California tiger salamander
- Delta smelt
- Salt marsh harvest mouse
- San Joaquin kit fox

The interim protective measures are no-use buffer zones adjacent to certain features within certain geographic areas in the eight counties. These buffer zones are different, depending on the species at issue and the pesticide being used. The specific buffer zones are available on the San Francisco Bay Area—Interim Pesticide Use Limitations interactive map (SFB interactive map; http://137.227.242.165/sfb/index.html).

Similar to Injunction 1, the Stipulated Injunction describes several exceptions or modifications to the buffers that otherwise apply.

Uses for which a Modified Buffer is Imposed. When the following pesticide uses are undertaken, the buffer indicated by the SFB interactive map may be reduced to 60 feet:

- spot treatments of wasp and hornet nests;
- individual tree removal using cut stump application; and
- basal bark applications.

Invasive Species and Noxious Weed Programs. The no-use buffers described on the SFB interactive map are reduced to 20 feet for aquatic and non-aquatic uses to control state or federally designated invasive species and noxious weeds, when such a program is administered by public entities and provided that:

- applications are limited to localized spot treatments using hand-held devices; and
- applications are overseen by a certified applicator; and
- applications are not made when precipitation is occurring or is forecast to occur within 24 hours after application; and
- if using 2,4-D, only the amine formulations are used.

Endangered Species Act Approved Uses. No buffers are imposed where use is permissible under one or more of the following:

- a "no jeopardy" biological opinion issued under the ESA Section 7(a)(2) by the USFWS that addresses the use of the pesticide and effects on any one or more of the 11 species subject to this Stipulated Injunction, provided that such use follows any "reasonable and prudent measures" established in connection with an incidental take statement included with the Service's biological opinion;
- a "reasonable and prudent alternative" identified in a "jeopardy" biological opinion issued under ESA Section (7)(a)(2) by the USFWS that addresses the use of the pesticide and its effects on any one or more of the 11 species subject to this Stipulated Injunction, provided that such use follows the "reasonable and prudent alternatives" and any "reasonable and prudent measures" in connection with the incidental take statement included with the Service's biological opinion;
- a written concurrence by the USFWS in a "not likely to adversely affect" determination made under ESA Section (7)(a)(2) that addresses the use of the pesticide and effects on any one or more of the 11 species subject to this Stipulated Injunction; or
- an incidental take permit issued by the USFWS under ESA Section 10(a) that authorizes the take of any of the 11 species subject to this Stipulated Injunction from application or use of the pesticide.

Project Applicability

Under the Proposed Project, pesticides would continue to be used in compliance with applicable state and federal laws. Furthermore, because a new USEPA bulletin for Santa Clara County has not yet been prepared, the SCVWD would continue to use pesticides in accordance with the voluntary guidelines established in the 2000 USEPA bulletin, *Protecting Endangered Species, Interim Measures for Use of Pesticides in Santa Clara County* (Bulletin). The use limitations applicable to a specific pesticide are based on:

- Class of the pesticide (e.g., herbicide, fungicide, or rodenticide [grain baits or fumigants])
- Active ingredient of the pesticide
- Activity category, which broadly defines the mode of action and use patterns of the pesticide
- Listed species potentially occurring at the use site, which are classified into hazard classes based on characteristics such as life forms and habitat requirements

These four components determine the use limitations that should be implemented when using a particular pesticide to minimize adverse effects to listed species.

The use limitations in this bulletin apply only to pesticide use in those areas shown in Figure J-1. Furthermore, within these areas, the use limitations apply only to the use of those pesticides for which the hazard class of the pesticide matches the hazard class of a species that may occur in the area, and where the pesticide will be used on a site consistent with the habitat of the species as noted in Table J-2.

The species hazard classes relevant to the Proposed Project are shown in Tables J-2 and J-3. Because the Bulletin is designed to minimize impacts to federally listed species, it does not include other special-status species. Nonetheless, characteristics of the other special-status species that may be adversely affected by the Proposed Project's pesticide use could be used to infer the appropriate hazard class, and thus use limitations, for those species.

Table J-2. Herbicide Hazard Classes and Applicable Species

Hazard Class	Federally Listed Species Addressed in the 2000 USEPA Bulletin for Santa Clara County	Other Special-Status Species in the Project Area that may be Similarly Affected
Aquatic Animals (AQ)	Chinook salmon Steelhead California clapper rail California least tern California red-legged frog	Foothill yellow-legged frog California tiger salamander
Dicot Plants (PD)	Santa Clara Valley dudleya Metcalf Canyon jewel-flower	Tiburon paintbrush Coyote ceanothus Big-scale balsamroot Pink creamsacs Mt. Hamilton thistle San Francisco collinsia Loma Prieta hoita Woolly-headed lessingia Smooth lessingia Most beautiful jewel-flower Bent-flowered fiddleneck Anderson's manzanita Brittlescale Round-leaved filaree Congdon's tarplant Santa Clara red ribbons Hospital Canyon larkspur Western leatherwood Hoover's button-celery Satan's goldenbush Showy golden madia Davidson's bush-mallow Hall's bush-mallow Oregon meconella Mt. Diablo cottonweed Robust monardella Hooked popcorn-flower Saline clover
Monocot Plants (PM)		Franciscan onion Fragrant fritillary

Source: Data compiled by Horizon Water and Environment in 2011

Table J-3. Rodenticide Hazard Classes and Applicable Species

Hazard Class	Federally Listed Species Addressed in the 2000 USEPA Bulletin for Santa Clara County	Other Special-Status Species in the Project Area that may be Similarly Affected
Grain Baits		
Carnivorous birds (CB)		Bald eagle Golden eagle Northern harrier White-tailed kite Long-eared owl Burrowing owl
Granivorous birds (GB)		Alameda song sparrow Tricolored blackbird
Salt marsh harvest mouse (HB)	Salt marsh harvest mouse	Salt marsh wandering shrew San Francisco dusky-footed woodrat
Kit fox (KF)	San Joaquin kit fox	
Burrow Fumigants		
Fossorial species (FS)	California red-legged frog San Joaquin kit fox	California tiger salamander California horned lizard Burrowing owl

Source: Data compiled by Horizon Water and Environment in 2011

Table J-4 lists those pesticides proposed for use under the Proposed Project that were covered in the 2000 USEPA bulletin for Santa Clara County, their species hazard class, and ULC. ULC codes are provided in Table J-5. SCVWD would implement these measures to avoid or minimize impacts from rodenticides to non-target species.

Table J-4. Proposed Pesticides and Use Limitation Codes

Pesticide	Type	Species Hazard Class	USEPA ULC
Clopyralid	Post-emergent Herbicide	PD	11, 17
Glyphosate	Post-emergent Herbicide	PD; PM	11, 17
Imazapyr	Post-emergent Herbicide	PD; PM	11, 16, 17, 19
Isoxaben	Post-emergent Herbicide	PD; PM	11, 16, 17, 19
Pendimethalin	Post-emergent Herbicide	AQ; PD; PM	11, 17
Triclopyr	Post-emergent Herbicide	AQ; PD	11, 17
Chlorophacinone	Rodenticide	CB; GB; HM; KF	1A, 1B, 1C, 1D, 2A, 2B, 2C, 2D, 3, 4, 7, 34
Diphacinone	Rodenticide	CB; GB; HM; KF	1A, 1B, 1C, 1D, 2A, 2B, 2C, 2D, 3, 4, 7, 34
Zinc phosphide	Rodenticide	CB; GB; HM; KF	1B, 1C, 3, 7, 34
Aluminum phosphide	Rodenticide	FS	5

Source: Data compiled by Horizon Water and Environment in 2011

Table J-5. Use Limitation Codes

Code	Limitation
1A	**Bait Station Applications** ***Formulation:*** The active ingredient shall not exceed 0.005 percent in the formulated bait.
1B	***Bait Station Design and Use:*** Bait stations shall be designed with an opening that prevents access to non-target species (not to exceed 3 inches) and controls bait spillage by feeding rodents. See your county agricultural commissioner for recommended designs and suggestions to retrofit existing stations. Bait stations shall be secured (e.g. staked) upright to prevent tipping and access by non-target animals. Bait stations shall not be filled beyond design capacity, and in no case shall bait stations be filled with more than 10 pounds of bait.
1C	***Station Monitoring:*** While treated baits are in use, bait stations shall be inspected for spillage, evidence of disturbance by non-target animals, excess moisture from irrigation systems, etc. Problems shall be corrected before baiting is resumed. Any spilled baits shall be promptly cleaned up (scattering limited quantities of spilled bait in non-crop areas is acceptable if allowed by labeling). Bait stations shall be replenished with treated baits as needed to provide continuous exposure. After treated baits are accepted, as evidenced by consumption of baits, depletion of bait in the bait station shall be inspected at least weekly for depletion of bait and refilled until feeding ceases. Treated baits shall be promptly removed (or bait stations shall be sealed) from all stations after feeding has ceased. If subsequent baiting is needed, a 2-week period without use of treated baits shall be observed before baiting is resumed. This is to keep the period when treated bait is exposed to a minimum without jeopardizing good pest control.
1D	***Carcass Survey and Disposal:*** Carcass survey and disposal shall be performed in the treated area beginning on the third day following the initial exposure of toxic baits. Any exposed carcasses shall be disposed of (e.g., completely buried) in a manner inaccessible to wildlife. Carcass surveys shall continue for at least 5 days after toxic baiting has ceased and thereafter until no more carcasses are found. Carcasses should be handled with care to avoid contact with parasites such as fleas.
2A	**Broadcast (Mechanical) and Spot (Hand) Applications** ***Formulation:*** The active ingredient shall not exceed 0.01 percent in the formulated bait.
2B	***Test Baiting/Bait Acceptanc***e: Prior to the main application of toxic baits by spot or broadcast method, a small amount of the bait shall be applied to determine bait acceptance. Test baits shall be broadcast by the same method that will be used for control baiting.
2C	***Use of Treated Bait***s: Use of treated baits shall begin only when bait acceptance is confirmed by consumption of test baits. Piling of baits shall be avoided. No additional applications shall be made whenever significant quantities of previously applied bait remain. Do not place baits directly into burrows. Do not exceed label application rates. **Spot Baiting:** Scatter a handful of bait (about 10 handfulls per pound) evenly over 40 to 50 square feet near active burrows or runways. Repeat every other day until feeding ceases. **Mechanical Spreader:** Apply at the rate of 10 pounds per swath acre through infested area. Follow with a second application in 2 to 3 days.
2D	***Carcass Survey and Disposal:*** See Limitation Code 1D.
3	Use of pelletized formulations for control of ground squirrels is prohibited except in bait stations, as described in Limitation Code 1 (A, B, C, E).

Table J-5. Use Limitation Codes

Code	Limitation
4	Jackrabbits may be controlled by using self-dispensing bait stations provided that: ▪ Bait acceptance is first determined. ▪ Carcasses are removed and stations are monitored as described in Limitation Codes 1C and 1D respectively. ▪ Baiting ceases when feeding stops. ▪ Baits are placed only where jackrabbits are active. ▪ Use of pelletized baits is prohibited.
5	Use shall be supervised by a person (wildlife biologist, county agricultural commissioner, university extension advisor, state or federal official or others) who is trained to distinguish dens and burrows of target species from those of non-target species. Use shall occur only in the active burrows of target species. The person responsible for supervision shall be aware of the conditions at the site of application and be available to direct and control the manner in which applications are made (per Title 3, California Code of Regulations Section 6406). Contact your county agricultural commissioner for information on training.
7	For commensal rodent control, outdoor use must be in tamper resistant bait boxes placed in areas inaccessible to wildlife.
11	Do not use in currently occupied habitat except: (1) as specified in Habitat Descriptors, (2) in organized habitat recovery programs, or (3) for selective control of invasive exotic plants.
15	Provide a 20-foot minimum strip of vegetation (on which pesticides should not be applied) along rivers, creeks, streams, wetlands, vernal pools and stock ponds or on the downhill side of fields where run-off could occur. Prepare land around fields to contain run-off by proper leveling, etc. Contain as much water "on-site" as possible. The planting of legumes or other cover crops for several rows adjacent to off-target water sites is recommended. Mix pesticides in areas not prone to runoff such as concrete mixing/loading pads, disked soil in flat terrain or graveled mix pads, or use a suitable method to contain spills and/or rinsate. Properly empty and triple-rinse pesticide containers at time of use.
16	Conduct irrigations efficiently to prevent excessive loss of irrigation waters through run-off. Schedule irrigations and pesticide applications to maximize the interval of time between the pesticide application and the first subsequent irrigation. Allow at least 24 hours between the application of pesticides listed in this bulletin and any irrigation that results in surface run-off into natural waters. Time applications to allow sprays to dry before rain or sprinkler irrigations. Do not make aerial applications while irrigation water is on the field unless surface run-off is contained for 72 hours following the application.
17	For sprayable or dust formulations: when the air is calm or moving away from habitat, commence applications on the side nearest the habitat and proceed away from the habitat. When air currents are moving toward habitat, do not make applications within 200 yards by air or 40 yards by ground upwind from occupied habitat. The county agricultural commissioner may reduce or waive buffer zones following a site inspection, if there is an adequate hedgerow, windbreak, riparian corridor or other physical barrier that substantially reduces the probability of drift.
19	Do not apply within 30 yards upslope of habitat unless a suitable method is used to contain or divert runoff waters.
34	For commensal rodent control, outdoor use near salt marshes is limited to sites that are separated by at least 10 yards of barren (or clean cultivated) ground from pickleweed habitat or from the inland side of the levee. This buffer strip should be above the high tide line.

Source: Data compiled by Horizon Water and Environment in 2011

Additional SCVWD Pesticide Use Guidelines

The SCVWD has set forth additional guidelines for pesticide use that go beyond the laws and regulations established by the regulatory agencies mentioned above. These additional guidelines are discussed next.

Herbicides

The goal of the SCVWD's Vegetation Management Program is to achieve the desired control while balancing environmental and economic considerations. Herbicides, although often the most effective means of managing vegetation economically, are routinely dismissed for some applications because of other factors, such as potential adverse effects on non-target species, which make their use in a given situation inappropriate. In the same context, herbicides used appropriately are, in many cases, the most environmentally desirable method for achieving the desired level of vegetation control. The selection of an approved herbicide, coupled with the use of an appropriate surfactant per label recommendations, can provide a higher level of vegetation control, which may reduce the frequency needed to service an area while also reducing physical impacts to the site, as compared to physical means of control. Targeted use of herbicides may eliminate the need to bring in heavy mowing equipment or large hand crews that can be more disruptive to on-site biological resources.

Herbicides are not broadcast sprayed across a channel, but are selectively sprayed at the herbaceous or woody plants targeted for removal by the design parameters of each particular stream reach. In upland areas, herbicides are sprayed on maintenance roads to provide clear access and on levee slopes to eliminate broadleaf weeds. The lowest recommended rate to achieve Proposed Project objectives of both herbicides and surfactants would be utilized to achieve desired control.

In addition, the SCVWD imposes the following restrictions on herbicide application:

- All herbicide usage must have the appropriate biological surveys and clearances.
- All herbicide applications must have a pest control recommendation provided by a California-licensed pest control advisor. A recommendation is provided after each site is surveyed and the most appropriate control methods for the site are determined.
- Foliar applications to woody vegetation are limited to less than 2 inches dbh and typically less than 8 feet in height.
- Aquatic herbicide can only be used in California red-legged frog and California tiger salamander SCVWD-mapped areas when the creek is dry and no rain is forecast for the next 48 hours.
- The use of surfactants on the 14 steelhead streams are permitted when:
    - The stream is dry in the immediate work location and no rain is forecast for the next 24 hours.
    - Spot spraying is necessary to control undesirable vegetation (e.g., invasive non-native vegetation or vegetation that falls outside the acceptable maintenance design of the facility).
    - Foliar spray work is a method necessary to maintain channel capacity per the engineering standards for the following facilities and locations:
        - Stevens Creek from U.S. Highway 101 to L'Avenida Avenue.
        - Guadalupe River

    - Reach G thru B (UPRR bridge to Highway 101)
    - Branham Lane upstream to Guadalupe Creek/Alamitos Creek confluence
    - Alamitos Creek from Guadalupe Creek confluence to Coleman Road
  - Uvas Creek (Bloomfield Road upstream to Santa Teresa Blvd.)
  - Llagas Creek (confluence with the Pajaro River upstream to Santa Teresa Blvd.)
- A 20-foot buffer is established between the treatment area and the wetted flow channel.
- Unmodified streams, as defined per the maps in this document, have the following limitations:
    - Pre-emergent herbicides are permitted in upland areas outside of the channel banks
    - Post-emergent herbicides may be applied in aquatic habitats to control non-native and invasive plant species.
    - Post-emergent herbicides may be applied outside the wetted channel (inboard slope, top of bank, and outboard slope) to control vegetation for fuel management, maintenance access, and ecological requirements.
    - Additional biological and pest control recommendations may be required to protect sensitive species and their habitats.

Appendix K
TRAFFIC AND TRANSPORTATION CALCULATIONS

Appendix K
TRAFFIC AND TRANSPORTATION CALCULATIONS

Table K1. Existing SMP Vehicle Miles Traveled by Speed Bin

Speed Bin	Yearly Vehicle Miles Traveled			
	Light Duty Vehicles[1]	Medium Duty Vehicles[2]	Heavy Duty Vehicles[3]	Other Large Trucks[4]
0.0 – 7.5 mph	397	118	2,380	2,159
7.5 – 12.5 mph	2,006	594	9,657	8,620
12.5 – 17.5 mph	27,933	8,278	90,081	11,214
17.5 – 22.5 mph	17,966	5,324	61,773	16,894
22.5 – 27.5 mph	71,900	21,306	220,440	18,538
27.5 – 32.5 mph	42,789	12,679	134,003	24,994
32.5 – 37.5 mph	45,542	13,495	137,372	41,137
37.5 – 42.5 mph	7,706	2,284	24,710	47,758
42.5 – 47.5 mph	10,819	3,206	34,430	55,035
47.5 – 52.5 mph	6,760	2,003	30,186	65,645
52.5 – 57.5 mph	9,535	2,826	33,287	97,873
57.5 – 62.5 mph	129,793	38,461	379,968	78,879
62.5 – 67.5 mph	52,672	15,608	154,198	17,615
Total	**425,818**	**126,182**	**1,312,485**	**486,361**

Notes:

1. Light Duty Vehicles are considered to be vehicles such as minivans and sedans.
2. Medium Duty Vehicles are considered to be vehicles such as Ford F-150 and Ranger pickup trucks.
3. Heavy Duty Vehicles are considered to be vehicles such as Ford E-350 cargo vans, Ford F-450 pickup trucks, crane trucks, water trucks, and Bobtail dump trucks.
4. Other large trucks are considered to be large 10-cy sediment removal dump trucks, 20-cy vegetation removal compactors, and other large semi-trucks that would be used to haul equipment or similar amounts of materials.

Source: Fehr & Peers 2010

Table K2. Proposed SMP Vehicle Miles Traveled by Speed Bin

Speed Bin	Yearly Vehicle Miles Traveled			
	Light Duty Vehicles[1]	Medium Duty Vehicles[2]	Heavy Duty Vehicles[3]	Other Large Trucks[4]
0.0 – 7.5 mph	458	119	2,424	2,321
7.5 – 12.5 mph	2,313	599	9,840	9,269
12.5 – 17.5 mph	32,211	8,340	91,791	12,057
17.5 – 22.5 mph	20,717	5,364	62,946	18,165
22.5 – 27.5 mph	82,912	21,467	224,629	19,934
27.5 – 32.5 mph	49,342	12,775	136,547	26,875
32.5 – 37.5 mph	52,517	13,597	139,980	44,234
37.5 – 42.5 mph	8,886	2,301	25,179	51,353
42.5 – 47.5 mph	12,475	3,230	35,084	59,178
47.5 – 52.5 mph	7,796	2,018	30,759	70,587
52.5 – 57.5 mph	10,996	2,847	33,919	105,241
57.5 – 62.5 mph	149,670	38,752	387,182	84,816
62.5 – 67.5 mph	60,739	15,726	157,126	18,940
Total	**491,033**	**127,136**	**1,337,407**	**522,971**

Notes:

1. Light Duty Vehicles are considered to be vehicles such as minivans and sedans.
2. Medium Duty Vehicles are considered to be vehicles such as Ford F-150 and Ranger pickup trucks.
3. Heavy Duty Vehicles are considered to be vehicles such as Ford E-350 cargo vans, Ford F-450 pickup trucks, crane trucks, water trucks, and Bobtail dump trucks.
4. Other large trucks are considered to be large 10-cy sediment removal dump trucks, 20-cy vegetation removal compactors, and other large semi-trucks that would be used to haul equipment or similar amounts of materials.

Source: Fehr & Peers 2010

Table K3. Existing Daily Trip Generation Estimates

Stream Maintenance Program Activity	Existing Average Vehicle Trips Per Day				
	Light Duty Vehicles[1]	Medium Duty Vehicles[2]	Heavy Duty Vehicles[3]	Other Large Trucks[4]	All Vehicles
Dry Season[5]					
Sediment Removal	20	0	28	142	**190**
Vegetation Removal	66	8	240	38	**352**
Animal Control	0	0	16	0	**16**
Minor Maintenance	108	28	204	0	**340**
Bank Stabilization	76	2	26	14	**118**
Other support	98	0	0	0	**98**
Total	**368**	**38**	**514**	**194**	**1,114**
Remainder of Year					
Sediment Removal	0	0	0	0	**0**
Vegetation Removal	16	6	154	44	**220**
Animal Control	0	0	16	0	**16**
Minor Maintenance	44	32	228	0	**304**
Bank Stabilization	0	0	0	0	**0**
Other support	4	0	0	0	**4**
Total	**64**	**38**	**398**	**44**	**544**

Notes:

1. Light Duty Vehicles are considered to be vehicles such as minivans and sedans.
2. Medium Duty Vehicles are considered to be vehicles such as Ford F-150 and Ranger pickup trucks.
3. Heavy Duty Vehicles are considered to be vehicles such as Ford E-350 cargo vans, Ford F-450 pickup trucks, crane trucks, water trucks, and Bobtail dump trucks.
4. Other large trucks are considered to be large 10-cy sediment removal dump trucks, 20-cy vegetation removal compactors, and other large semi-trucks that would be used to haul equipment or similar amounts of materials.
5. Dry Season is generally June 15 through October 15

Source: Fehr & Peers 2010

Table K4. Existing Annual Trip Generation Estimates

Stream Maintenance Program Activity	Total Existing Vehicle Trips				
	Light Duty Vehicles[1]	Medium Duty Vehicles[2]	Heavy Duty Vehicles[3]	Other Large Trucks[4]	All Vehicles
Dry Season[5] (A)					
Sediment Removal	1,700	0	2,380	12,070	**16,150**
Vegetation Removal	5,610	680	20,400	3,230	**29,920**
Animal Control	0	0	1,360	0	**1,360**
Minor Maintenance	9,180	2,380	17,340	0	**28,900**
Bank Stabilization	6,460	170	2,210	1,190	**10,030**
Other support	8,330	0	0	0	**8,330**
Total	**31,280**	**3,230**	**43,690**	**16,490**	**94,690**
Remainder of Year[6] (B)					
Sediment Removal	0	0	0	0	**0**
Vegetation Removal	2,720	1,020	26,180	7,480	**37,400**
Animal Control	0	0	2,720	0	**2,720**
Minor Maintenance	7,480	5,440	38,760	0	**51,680**
Bank Stabilization	0	0	0	0	**0**
Other support	680	0	0	0	**680**
Total	**10,880**	**6,460**	**67,660**	**7,480**	**92,480**
Total Yearly (A+B)					
Sediment Removal	1,700	0	2,380	12,070	**16,150**
Vegetation Removal	8,330	1,700	46,580	10,710	**67,320**
Animal Control	0	0	4,080	0	**4,080**
Minor Maintenance	16,660	7,820	56,100	0	**80,580**
Bank Stabilization	6,460	170	2,210	1,190	**10,030**
Other support	9,010	0	0	0	**9,010**
Total	**42,160**	**9,690**	**111,350**	**23,970**	**187,170**

Stream Maintenance Program Activity	Total Existing Vehicle Trips				
	Light Duty Vehicles[1]	Medium Duty Vehicles[2]	Heavy Duty Vehicles[3]	Other Large Trucks[4]	All Vehicles

Notes:

1. Light Duty Vehicles are considered to be vehicles such as minivans and sedans.
2. Medium Duty Vehicles are considered to be vehicles such as Ford F-150 and Ranger pickup trucks.
3. Heavy Duty Vehicles are considered to be vehicles such as Ford E-350 cargo vans, Ford F-450 pickup trucks, crane trucks, water trucks, and Bobtail dump trucks.
4. Other large trucks are considered to be large 10-cy sediment removal dump trucks, 20-cy vegetation removal compactors, and other large semi-trucks that would be used to haul equipment or similar amounts of materials.
5. Dry Season is generally June 15 through October 15. Average daily Dry Season trips are multiplied by the 85 workdays in the dry season work period.
6. Average daily Remainder of Year trips are multiplied by the 170 workdays in the work period.

Source: Fehr & Peers 2010

Table K5. Existing Daily Vehicle Miles Traveled Estimates

Stream Maintenance Program Activity	Existing Average Vehicle Miles Traveled Per Day				
	Light Duty Vehicles[1]	Medium Duty Vehicles[2]	Heavy Duty Vehicles[3]	Other Large Trucks[4]	All Vehicles
Dry Season[5]					
Sediment Removal	212	9	272	1,721	**2,214**
Vegetation Removal	673	89	2,612	1,117	**4,491**
Animal Control	0	0	543	0	**543**
Minor Maintenance	1,153	392	2,275	0	**3,820**
Bank Stabilization	713	15	248	236	**1,212**
Other support	993	0	0	0	**993**
Total	**3,744**	**505**	**5,950**	**3,074**	**13,273**
Remainder of Year					
Sediment Removal	0	0	0	0	**0**
Vegetation Removal	152	58	1,670	1,323	**3,203**
Animal Control	0	0	543	0	**543**
Minor Maintenance	456	436	2,530	0	**3,422**
Bank Stabilization	0	0	0	0	**0**
Other support	24	0	0	0	**24**
Total	**632**	**494**	**4,743**	**1,323**	**7,192**

Notes:

1. Light Duty Vehicles are considered to be vehicles such as minivans and sedans.
2. Medium Duty Vehicles are considered to be vehicles such as Ford F-150 and Ranger pickup trucks.
3. Heavy Duty Vehicles are considered to be vehicles such as Ford E-350 cargo vans, Ford F-450 pickup trucks, crane trucks, water trucks, and Bobtail dump trucks.
4. Other large trucks are considered to be large 10-cy sediment removal dump trucks, 20-cy vegetation removal compactors, and other large semi-trucks that would be used to haul equipment or similar amounts of materials.
5. Dry Season is generally June 15 through October 15

Source: Fehr & Peers 2010

Table K6. Existing Annual Vehicle Miles Traveled Estimates

Stream Maintenance Program Activity	Total Existing Vehicle Miles Traveled				
	Light Duty Vehicles[1]	Medium Duty Vehicles[2]	Heavy Duty Vehicles[3]	Other Large Trucks[4]	All Vehicles
Dry Season[5] (A)					
Sediment Removal	18,020	0	23,120	146,285	**187,425**
Vegetation Removal	57,205	7,565	222,020	94,945	**381,735**
Animal Control	0	0	46,155	0	**46,155**
Minor Maintenance	98,000	33,320	193,375	0	**324,700**
Bank Stabilization	60,605	1,275	21,080	20,060	**103,020**
Other support	84,405	0	0	0	**84,405**
Total	**318,240**	**42,160**	**505,750**	**261,290**	**1,128,205**
Remainder of Year[6] (B)					
Sediment Removal	0	0	0	0	**0**
Vegetation Removal	25,840	9,860	283,900	224,910	**544,510**
Animal Control	0	0	92,310	0	**92,310**
Minor Maintenance	77,521	74,120	430,100	0	**581,741**
Bank Stabilization	0	0	0	0	**0**
Other support	4,080	0	0	0	**4,080**
Total	**107,441**	**83,980**	**806,310**	**224,910**	**1,222,641**
Total Yearly (A+B)					
Sediment Removal	18,020	0	23,120	146,285	**187,425**
Vegetation Removal	83,045	17,425	505,920	319,855	**926,245**
Animal Control	0	0	138,465	0	**138,465**
Minor Maintenance	175,526	107,440	623,475	0	**906,441**
Bank Stabilization	60,605	1,275	21,080	20,060	**103,020**
Other support	88,485	0	0	0	**88,485**
Total	**425,681**	**126,140**	**1,312,060**	**486,200**	**2,350,846**

Stream Maintenance Program Activity	Total Existing Vehicle Miles Traveled				
	Light Duty Vehicles[1]	Medium Duty Vehicles[2]	Heavy Duty Vehicles[3]	Other Large Trucks[4]	All Vehicles

Notes:

1. Light Duty Vehicles are considered to be vehicles such as minivans and sedans.
2. Medium Duty Vehicles are considered to be vehicles such as Ford F-150 and Ranger pickup trucks.
3. Heavy Duty Vehicles are considered to be vehicles such as Ford E-350 cargo vans, Ford F-450 pickup trucks, crane trucks, water trucks, and Bobtail dump trucks.
4. Other large trucks are considered to be large 10-cy sediment removal dump trucks, 20-cy vegetation removal compactors, and other large semi-trucks that would be used to haul equipment or similar amounts of materials.
5. Dry Season is generally June 15 through October 15. Average daily Dry Season trips are multiplied by the 85 workdays in the dry season work period.
6. Average daily Remainder of Year trips are multiplied by the 170 workdays in the work period.

Source: Fehr & Peers 2010

Table K7. Existing Annual Vehicle Miles Traveled per Vehicle Trip Estimates

Stream Maintenance Program Activity	Existing Yearly Vehicle Miles Traveled Per Vehicle Trip				
	Light Duty Vehicles[1]	Medium Duty Vehicles[2]	Heavy Duty Vehicles[3]	Other Large Trucks[4]	Average of All Vehicles
Sediment Removal	10.60	0.00	9.71	12.12	**10.81**
Vegetation Removal	9.97	10.25	10.86	29.87	**15.24**
Animal Control	0.00	0.00	33.94	0.00	**33.94**
Minor Maintenance	10.54	13.74	11.11	0.00	**11.80**
Bank Stabilization	9.38	7.50	9.54	16.86	**10.82**
Other support	9.82	0.00	0.00	0.00	**9.82**
Average of all activities	**10.06**	**10.50**	**15.03**	**19.61**	**15.40**

Notes:

1. Light Duty Vehicles are considered to be vehicles such as minivans and sedans.
2. Medium Duty Vehicles are considered to be vehicles such as Ford F-150 and Ranger pickup trucks.
3. Heavy Duty Vehicles are considered to be vehicles such as Ford E-350 cargo vans, Ford F-450 pickup trucks, crane trucks, water trucks, and Bobtail dump trucks.
4. Other large trucks are considered to be large 10-cy sediment removal dump trucks, 20-cy vegetation removal compactors, and other large semi-trucks that would be used to haul equipment or similar amounts of materials.
5. Dry Season is generally June 15 through October 15

Source: Fehr & Peers 2010

Table K8. List of Vehicles in Each Vehicle Classification

Light Duty Vehicles				
Minivan/Caravan	Minivan/Voyoger	Sedan/Contour	Sedan/Taurus	Toyota Prius Hybrid Sedan
Medium Duty Vehicles				
	F-150/4X2	F-250/2Wd	Ranger/4X2	
Heavy Duty Vehicles				
General Heavy Duty				
E-350/4X4/Full Size Cargo Van	E-350	E-350/Electrician	E-350/ Full Size Cargo Van	E-350/ Raised Roof
F-150/4X4	F-250/2Wd/ Utility Body	F-250/4X4/ Utility Body	F-250/4X4	F-350/4X2/ Utility Body
F-350/4X4/ Utility Body	F-450/ Utility Body	F-550/4X4/ Utility Body	F-800/Flatbed	F-800/ Utility Body
	Ranger/4X4/ Platform Top	Suv/Cherokee	Suv/Explorer	
Specialty Heavy Duty				
T-300/4X4/ Mechanics Truck	Cf8000/ Compactor	E-350/Hvac	F-250/4X4/ Welding	F-250/4X4/ Spray Rig
F-350/4X4/Auger	F-350/4X4/ Spray Rig	F-350/Utility Body/Crane	F-450/4X2/ Dump Body	F-450/4X4/ Vegetation Stakeside
F-450/Compactor	F-450/Flatbed Stakeside with Liftgate	F-550 with Versalift	F-550/4X4/ Mechanic'S Truck	F-550/Compactor
F-700/ Flatbed Rollback	F-750/Flatbed/ Stakeside/ Dump Body	F-800/4X4/Welder	F-800/High Ranger	Hb200/Van/Cargo
L8500/Compactor	Ln800/ Crane/10 Ton	Lt9000/Dump	Lt9500 Truck/ Crane/10 Ton	Lt9500/ Crane Truck/ Knuckleboom
Lt9500/ Crane/17 Ton	Lt9500/Crane/ Manitex 1461/ 14 Ton/Ds	Lt9513/Bobtail Dump Body	Lt9513/Dump	Lt9513/ Water Truck
	P-330/Fuel Truck	W4/Van/Liftgate	W900/Heavy Haul	

Source: SCVWD 2010

Table K9. Historical VMT per Vehicle Type

Vehicle Type	No. of Vehicles	Sum of 2006 Mileage	Sum of 2007 Mileage	Average Mileage	Average Mileage per Vehicle
Light Duty	73	456,061	396,993	426,528	5,843
Medium Duty	23	110,927	110,324	110,627	4,810
Heavy Duty	206	1,293,565	1,335,178	1,314,386	6,381

Source: SCVWD 2010

Table K10. Number of Work Activity Jobs per Basin in 2009

Activity	Santa Clara Basin	Pajaro Basin
Sediment	18	3
Bank Stabilization	30	2
Vegetation Management	27	18

Source: SCVWD 2010

Table K11. Number of Light Duty Vehicles and Light Duty Vehicle Hours per Job Type per Basin in 2009

Watershed Name	Work Activity	Vehicle Hours	Vehicle Category	Vehicle Count
Coyote	Bank Stabilization	1642.90	heavy	228
Coyote	Bank Stabilization	98.00	light	10
Coyote	Bank Stabilization	393.00	medium	60
Coyote	Minor Maintenance	2538.95	heavy	469
Coyote	Minor Maintenance	160.00	light	22
Coyote	Minor Maintenance	2356.50	medium	715
Coyote	Sediment	614.60	heavy	109
Coyote	Sediment	24.00	light	4
Coyote	Sediment	98.00	medium	27
Coyote	Vegetation Management	3182.70	heavy	528
Coyote	Vegetation Management	16.00	light	2
Coyote	Vegetation Management	1046.50	medium	158
Guadalupe	Bank Stabilization	2839.10	heavy	386
Guadalupe	Bank Stabilization	81.50	light	10
Guadalupe	Bank Stabilization	156.00	medium	38
Guadalupe	Minor Maintenance	618.50	heavy	164
Guadalupe	Minor Maintenance	20.00	light	4
Guadalupe	Minor Maintenance	1230.50	medium	360
Guadalupe	Sediment	1622.70	heavy	244

Table K11. Number of Light Duty Vehicles and Light Duty Vehicle Hours per Job Type per Basin in 2009

Watershed Name	Work Activity	Vehicle Hours	Vehicle Category	Vehicle Count
Guadalupe	Sediment	103.00	light	16
Guadalupe	Sediment	392.00	medium	62
Guadalupe	Vegetation Management	1905.25	heavy	307
Guadalupe	Vegetation Management	255.00	medium	68
Lower Peninsula	Bank Stabilization	334.50	heavy	51
Lower Peninsula	Bank Stabilization	40.00	light	5
Lower Peninsula	Bank Stabilization	147.00	medium	25
Lower Peninsula	Minor Maintenance	1093.85	heavy	763
Lower Peninsula	Minor Maintenance	46.00	light	7
Lower Peninsula	Minor Maintenance	516.00	medium	324
Lower Peninsula	Sediment	306.25	heavy	42
Lower Peninsula	Sediment	4.00	light	1
Lower Peninsula	Sediment	36.00	medium	8
Lower Peninsula	Vegetation Management	802.25	heavy	178
Lower Peninsula	Vegetation Management	163.00	medium	29
Pajaro	Bank Stabilization	211.00	heavy	27
Pajaro	Bank Stabilization	72.00	light	9
Pajaro	Bank Stabilization	1.00	medium	1
Pajaro	Minor Maintenance	479.00	heavy	129
Pajaro	Minor Maintenance	24.00	light	3
Pajaro	Minor Maintenance	169.00	medium	77
Pajaro	Sediment	392.00	heavy	58
Pajaro	Sediment	8.00	light	1
Pajaro	Sediment	4.00	medium	2
Pajaro	Vegetation Management	1225.00	heavy	212
Pajaro	Vegetation Management	34.00	light	4
Pajaro	Vegetation Management	104.00	medium	19
West Valley	Bank Stabilization	1855.75	heavy	288
West Valley	Bank Stabilization	132.00	light	77
West Valley	Bank Stabilization	598.00	medium	109
West Valley	Minor Maintenance	1725.45	heavy	888
West Valley	Minor Maintenance	80.00	light	12
West Valley	Minor Maintenance	954.50	medium	456
West Valley	Sediment	2365.80	heavy	335
West Valley	Sediment	4.00	light	1
West Valley	Sediment	288.00	medium	46

Table K11. Number of Light Duty Vehicles and Light Duty Vehicle Hours per Job Type per Basin in 2009

Watershed Name	Work Activity	Vehicle Hours	Vehicle Category	Vehicle Count
West Valley	Vegetation Management	2041.00	heavy	355
West Valley	Vegetation Management	16.00	light	4
West Valley	Vegetation Management	221.00	medium	44

Source: SCVWD 2010

Table K12. Additional Light Duty Vehicle Usage

Summer Work Season			
5 subbasins *	1 light crew truck *	88 days (June 15 - Oct 15) =	**440 trips**
Non-Summer Work Season			
Work Units		**No. of Vehicles/day**	
Vegetation Management Unit		2.5	
Watershed Field Operations		10	
Watershed Maintenance Staff		10	
Watershed Program Support		0.2	

Source: SCVWD 2010

Table K13. Vegetation Management Compactor Usage

Watershed Name	Vehicle Description	Days	Cubic Yards	Trips
Coyote	Compactor, Refuse (6 CY)	3	4.25	6
Coyote	Compactor, Refuse (20CY)	135	15	270
Coyote	Compactor	71	15	142
Guadalupe	Compactor, Refuse (6 CY)	13	4.25	26
Guadalupe	Compactor, Refuse (20CY)	32	15	64
Guadalupe	Compactor, Refuse (7 CY)	2	5	4
Guadalupe	Compactor	31	15	62
Guadalupe (Canal/ditch)	Compactor, Refuse (20CY)	12	15	24
Lower Peninsula	Compactor, Refuse (6 CY)	11	4.25	22
Lower Peninsula	Compactor, Refuse (20CY)	28	15	56
Lower Peninsula	Compactor, Refuse (7 CY)	464	5	928
Lower Peninsula	Compactor	3	15	6
Pajaro	Compactor, Refuse (6 CY)	3	4.25	6
Pajaro	Compactor, Refuse (20CY)	45	15	90
Pajaro	Compactor, Refuse (7 CY)	1	5	2
Pajaro	Compactor	20	15	40
West Valley	Compactor, Refuse (6 CY)	5	4.25	10
West Valley	Compactor, Refuse (20CY)	32	15	64
West Valley	Compactor, Refuse (7 CY)	501	5	1002
West Valley	Compactor	17	15	34

Source: SCVWD 2010

Table K14. SCVWD SMP Activity Locations

Watershed	Watershed Centroid Location
Lower Peninsula	El Monte Ave & Cuesta Dr, Los Altos, CA
West Valley	Lawrence Expressway & De Soto Ave, Sunnyvale , CA
Guadalupe	Cottle Ave & Dry Creek Rd, San Jose, CA
Coyote	Capitol Expressway & Nieman Blvd, San Jose, CA
Pajaro	Buena Vista Ave & Noname Uno Rd, Gilroy CA
Disposal Site	**Location**
Pond A8	1700 Gold Street, San Jose, CA
Newby Island Landfill	1601 Dixon Landing Rd, Milpitas, CA 95035
Guadalupe Landfill	15999 Guadalupe Mines Rd, San Jose CA 95120
Kirby Canyon	910 Coyote Creek Golf Dr, Morgan Hill CA 95037
Facility	**Location**
Animal Mgmt. Ctr.	16170 Vineyard Blvd, Morgan Hill, CA 95037
Water District HQ	5750 Almaden Expressway, San Jose, CA
Material Delivery Site	**Location**
Stevens Creek Quarry	12100 Stevens Canyon Road, Cupertino, CA 95014
West Coast Aggregate	Berryessa Rd, San Jose
Lexington Quarry	18500 Limekiln Canyon Rd, Los Gatos, CA 95033-8629
Granite Rock, Aromas	170 Aromitas Road, Aromas, CA 95004-9602
Granite Rock, Berryessa	11711 Berryessa Road, San Jose, CA, 95133-1092

Source: Fehr & Peers 2010 and SCVWD 2010

Table K15. Average Number of Monthly Trips for Rodent Control per Subbasin

Subbasins	Number of Trips
Lower Peninsula	19
West Valley	18
Guadalupe	31
Coyote	34
Pajaro	13

Source: SCVWD 2010

Table K16. Distribution of Sediment Removal Disposal Locations

Watershed	Disposal Location			
	Pond A8	Newby	Guadalupe	Kirby
Lower Pen	90%	0%	10%	0%
West Valley	60%	0%	40%	0%
Guadalupe	25%	0%	65%	10%
Coyote	5%	45%	5%	45%
Pajaro	0%	0%	0%	100%

Source: Fehr & Peers 2010

Table K17. Distribution of Vegetation Removal Disposal Locations

Watershed	Disposal Location			
	Pond A8	Newby	Guadalupe	Kirby
Lower Pen	0%	90%	10%	0%
West Valley	0%	45%	55%	0%
Guad	0%	25%	65%	10%
Coyote	0%	50%	10%	40%
Pajaro	0%	0%	0%	100%

Source: Fehr & Peers 2010

Table K18. Determination of Average Days in the Current SMP Dry Season Work Window

Year	Work Weeks	Plus Days	Holidays	Total Days
2002	17	2	3	84
2003	17	2	3	84
2004	17	4	3	86
2005	17	3	3	85
2006	17	2	3	84
2007	17	2	3	84
2008	17	3	3	85
2009	17	4	3	86
2010	17	3	3	85
			Average:	**85**

Source: Fehr & Peers 2010

Table K19. Trip Lengths between SMP Activity Centers

From	To	Trip Miles
SCVWD HQ	Lower Peninsula	21
SCVWD HQ	West Valley	14
SCVWD HQ	Guadalupe	4
SCVWD HQ	Coyote	9
SCVWD HQ	Pajaro	25
Animal Mgmt. Ctr.	Lower Peninsula	37
Animal Mgmt. Ctr.	West Valley	30
Animal Mgmt. Ctr.	Guadalupe	22
Animal Mgmt. Ctr.	Coyote	20
Animal Mgmt. Ctr.	Pajaro	7
Lower Peninsula	Pond A8	10
West Valley	Pond A8	8
Guadalupe	Pond A8	15
Coyote	Pond A8	15
Pajaro	Pond A8	38
Lower Peninsula	Newby Island Landfill	15
West Valley	Newby Island Landfill	16
Guadalupe	Newby Island Landfill	16
Coyote	Newby Island Landfill	15
Pajaro	Newby Island Landfill	38
Lower Peninsula	Guadalupe Landfill	20
West Valley	Guadalupe Landfill	14
Guadalupe	Guadalupe Landfill	8
Coyote	Guadalupe Landfill	13
Pajaro	Guadalupe Landfill	30
Lower Peninsula	Kirby Canyon Landfill	33
West Valley	Kirby Canyon Landfill	24
Guadalupe	Kirby Canyon Landfill	17
Coyote	Kirby Canyon Landfill	13
Pajaro	Kirby Canyon Landfill	13
Stevens Creek Quarry	SCVWD HQ	20
Lexington Quarry	SCVWD HQ	14
Granite Rock, Berryessa	SCVWD HQ	12
Granite Rock, Aromas	SCVWD HQ	46

*Note that Watershed locations are the centroid locations

Source: Fehr & Peers 2010

Appendix L
MITIGATION MONITORING AND REPORTING PROGRAM

Appendix L
MITIGATION AND MONITORING REPORTING PROGRAM

Santa Clara Valley Water District
Stream Maintenance Program Update
Administrative Final
Subsequent Environmental Impact Report

Introduction

This Mitigation Monitoring and Reporting Program (MMRP) has been prepared pursuant to State of California Public Resources Code Section 21081.6, which requires adoption of a MMRP for projects in which the lead agency has required changes or adopted mitigation to avoid significant environmental effects. The Santa Clara Valley Water District (SCVWD) is the lead agency for the proposed Stream Maintenance Program (SMP) Update (SMP Update or Proposed Project) and, therefore, responsible for administrating and implementing the MMRP. The decision-makers must define specific reporting and/or monitoring requirements to be enforced during SMP Update implementation, before final approval of the Proposed Project. The primary purpose of the MMRP is to ensure that the mitigation measures identified in SCVWD's Final Subsequent Environmental Impact Report (FSEIR) are implemented to reduce or avoid identified environmental effects.

The purpose of discussing the MMRP in the ~~Draft SEIR (DSEIR)~~ FSEIR is to appropriately assign the mitigation responsibilities for implementing the Proposed Project. The mitigation measures listed in the MMRP are required by law or regulation and will be adopted by SCVWD as a condition of the primary SMP Update approval.

Mitigation is defined by the California Environmental Quality Act (CEQA), Section 15370 as a measure that:

- avoids the impact altogether by not taking a certain action or parts of an action;
- minimizes impacts by limiting the degree or magnitude of the action and its implementation;
- rectifies the impact by repairing, rehabilitating, or restoring the impacted environment;
- reduces or eliminates the impact over time by preservation and maintenance activities during the life of the action; and
- compensates for the impacts by replacing or providing substitute resources or environments.

Mitigation measures provided in this MMRP were initially identified in Chapter 3, Environmental Setting and Impact Analysis of the ~~DSEIR~~Draft Subsequent Environmental Impact Report (DSEIR), as feasible and effective in mitigating Proposed Project-related environmental impacts. As a result of comments received during public review of the DSEIR, these mitigation measures ~~will be~~ have been revised as necessary.

Basis for the Mitigation Monitoring and Reporting Program

The legal basis for the development and implementation of the MMRP lies within CEQA (including the California Public Resources Code). Sections 21002 and 21002.1 of the California Public Resources Code state:

- Public agencies are not to approve projects as proposed if there are feasible alternatives or feasible mitigation measures available that would substantially lessen the significant environmental effects of such projects; and
- Each public agency shall mitigate or avoid the significant effects on the environment of projects that it carries out or approves whenever it is feasible to do so.

Section 21081.6 of the California Public Resources Code further requires that the public agency shall adopt a reporting or monitoring program for the changes made to the project or conditions of project approval, adopted to mitigate or avoid significant effects on the environment. The reporting or monitoring program shall be designed to ensure compliance with mitigation measures during project implementation. The monitoring program must be adopted when a public agency makes its findings under CEQA so that the program can be made a condition of project approval in order to mitigate significant effects on the environment.

Mitigation Monitoring and Reporting Program Procedures

The MMRP for the Proposed Project will be in place through all phases of the SMP Update. SCVWD shall have primary responsibility for administrating the MMRP activities of staff, consultants, or contractors. SCVWD has the responsibility of ensuring that monitoring is documented through periodic reports and that deficiencies are promptly corrected. SCVWD's designated environmental monitor will track and document compliance with mitigation measures, note any problems that may result, and take appropriate action to remedy problems. Specific responsibilities of SCVWD will include:

- coordination of all mitigation monitoring activities;
- management of the preparation, approval, and filing of monitoring or permit compliance reports;
- maintenance of records concerning the status of all approved mitigation measures;
- quality control assurance of field monitoring personnel;
- coordination with other agencies regarding compliance with mitigation or permit requirements;

- reviewing and recommending acceptance and certification of implementation documentation; and

- acting as a contact for interested parties or surrounding property owners who wish to register complaints, observations of unsafe conditions, or environmental violations; verifying any such circumstances and developing any necessary corrective actions.

Resolution of Noncompliance Complaints

Any person or agency may file a complaint about noncompliance with the mitigation measures that are adopted as part of the approval process for the SMP Update. The complaint shall be directed to SCVWD (5750 Almaden Expressway, San Jose, CA 95118-3686, or e-mail smp_update@valleywater.org) in written form, providing detailed information on the purported violation. SCVWD will investigate any complaints filed to determine the validity of the complaint. If noncompliance with a mitigation measure is verified, SCVWD shall take the necessary action(s) to remedy the violation. The complaint shall receive written confirmation indicating the results of the investigation or the final corrective action that was implemented in response to the specific noncompliance issue.

Mitigation Monitoring and Reporting Plan Matrix

The MMRP is organized in a matrix format. The first column identifies the mitigation measure number. The second column describes each mitigation measure. The third column, "Time Frame for Implementation," refers to when monitoring will occur. The timing for implementing mitigation measures and the definition of the approval process has been provided to assist staff from SCVWD to plan for monitoring activities. The fourth column, "Responsible Monitoring Entity," refers to the entity responsible for ensuring that the mitigation measure is implemented. The fifth column, "Verification of Compliance," has subcolumns for Initials, Date, and Remarks. This last column will be used by SCVWD, as lead agency, to document the person who verified the implementation of the mitigation measure, the date on which this verification occurred, and any other notable remarks.

MITIGATION AND MONITORING REPORTING PROGRAM

Santa Clara Valley Water District
Stream Maintenance Program Update
Administrative Final Subsequent Environmental Impact Report

No.	Mitigation Measure[1]	Time Frame for Implementation	Responsible Monitoring Entity	Verification of Compliance		
				Initials	Date	Remarks
Air Quality						
AIR-1A	**Reduction in Fleet Emissions**	Prior to implementing NOx-generating activities under the Proposed Project	District			
AIR-1B	**Off-site NOx Emissions Mitigation Program**	Prior to implementing NOx-generating activities under the Proposed Project	District			
AIR-1C	**NOx Emissions Offsets[2]**	Prior to implementing NOx-generating activities under the Proposed Project	District			
Biology						
BIO-1	**Implement Compensatory Mitigation for Wetlands and Other Waters**	Annually in accordance with the annual work plan	District			
BIO-2	**Implement Compensatory Mitigation for Woody Riparian Vegetation**	Annually in accordance with the annual work plan	District			

No.	Mitigation Measure[1]	Time Frame for Implementation	Responsible Monitoring Entity	Verification of Compliance		
				Initials	Date	Remarks
BIO-3	**Implement Compensatory Mitigation for Serpentine Communities**	Annually in accordance with the annual work plan	District			
BIO-4	**Implement Compensatory Mitigation for Serpentine-Associated Special-Status Plant Species**	Annually in accordance with the annual work plan	District			
BIO-5	**Implement Compensatory Mitigation for Impacts to Non-Serpentine Special-Status Plant Species**	Annually in accordance with the annual work plan	District			
BIO-6	**Implement Compensatory Mitigation for Impacts to Serpentine-Associated Special-Status Invertebrates**	Annually in accordance with the annual work plan	District			
BIO-7	**Tree Replacement**	Annually in accordance with the annual work plan	District			
BIO-8	**Augmentation of Spawning Gravel**	Annually in accordance with the annual work plan	District			
BIO-9	**Augmentation of Instream Complexity for Non-Tidal Stream Fish**	Annually in accordance with the annual work plan	District			
BIO-10	**Implement Compensatory Mitigation for the California Tiger Salamander**	Annually in accordance with the annual work plan	District			

No.	Mitigation Measure[1]	Time Frame for Implementation	Responsible Monitoring Entity	Verification of Compliance		
				Initials	Date	Remarks
BIO-11	**Implement Compensatory Mitigation for the California Red-Legged Frog**	Annually in accordance with the annual work plan	District			
BIO-12	**Implement Compensatory Mitigation for the Least Bell's Vireo**	Annually in accordance with the annual work plan	District			
BIO-13	**Implement Compensatory Mitigation for the Burrowing Owl**	Annually in accordance with the annual work plan	District			
BIO-14	**Implement Compensatory Mitigation for the Yellow Warbler**	Annually in accordance with the annual work plan	District			
BIO-15	**Provide Alternative Bat Roost**	Annually in accordance with the annual work plan	District			
BIO-16	**Invasive Plant ~~Species~~ Management Program**	Annually in accordance with the annual work plan	District			
Global Climate Change						
GCC-1A	**On-site or Off-site GHG Emissions Mitigation Program**	Prior to implementing GHG-generating activities under the Proposed Project	District			

No.	Mitigation Measure[1]	Time Frame for Implementation	Responsible Monitoring Entity	Verification of Compliance		
				Initials	Date	Remarks
GCC-1B	**Greenhouse Gas Emissions Offsets**	Prior to implementing GHG-generating activities under the Proposed Project	District			

1 See full text on the following pages.

2 Source: Allen, Donald. Cantor Co2e (http://www.cantorco2e.com/Environment/?page=USAComp_ERC-BAAQMD). May 6 and May 7, 2011—telephone conversations with Ryan Jolley of Horizon Water and Environment regarding NOx credits.

Mitigation Measure AIR-1A Reduction in Fleet Emissions

The District will develop a plan to demonstrate that the off-road equipment (more than 50 horsepower) to be used in the SMP Update (i.e., owned, leased, and subcontractor vehicles) would achieve a project–wide, fleet-average 20 percent NOx reduction compared to the most recent ARB fleet average. Acceptable options for reducing emissions include the use of late-model engines, low-emission diesel products, alternative fuels, engine retrofit technology, after-treatment products, add-on devices (such as particulate filters), and/or other options as they become available.

Mitigation Measure AIR-1B Off-site NOx Emissions Mitigation Program

SCVWD may establish a program to implement off-site NOx emissions reduction projects within the SFBAAB to reduce those NOx emissions from the SMP Update in exceedance of BAAQMD operational significance thresholds. The total reduction will be 9 tons (the average annual exceedance anticipated over the lifetime of the SMP Update, based on the average between estimated 2012 and 2020 emissions), as adjusted based on the emissions reductions to be achieved by Mitigation Measure AIR-1A. The NOx emission reductions projects will be from sources of emissions that are not required by any existing law to reduce their NOx emissions. Offsetting annual emissions inherently includes offsetting daily emissions. Therefore, no additional reductions will be required for daily NOx emissions. Documentation of off-site NOx reductions will be provided to the BAAQMD.

Mitigation Measure AIR-1C NOx Emissions Offsets

As an alternative to Mitigation Measure AIR-1B, SCVWD will purchase NOx emission reduction credits to reduce or offset those NOx emissions in exceedance of BAAQMD operational significance thresholds. The total reduction (or credits) will be 9 tons, as adjusted based on the emissions reductions achieved by Mitigation Measure AIR-1A. Offsetting annual emissions inherently includes offsetting daily emissions. Therefore, no additional offsets will be required for daily NOx emissions.

SCVWD will engage a private broker to facilitate the purchase of credits through the BAAQMD emissions bank. Purchase of these credits from the BAAQMD emissions bank will ensure that NOx offsets occur in the SFBAAB. Once NOx emission reduction credits are purchased for a given quantity, that amount of NOx will be offset in perpetuity. Therefore, a one-time purchase of 9 tons of credits will mitigate for the duration of the SMP Update (2012-2022) as well as for future SMP-related emissions beyond 2022, assuming emissions will not have increased.

Documentation of purchased NOx offsets will be provided to the BAAQMD.

Mitigation Measure BIO-1: Implement Compensatory Mitigation for Wetlands and Other Waters

The compensatory mitigation package, which is detailed in Appendix C, 2012–2022 SMP Update Mitigation Approach Memorandum, shall be implemented to compensate for new impacts (i.e., work areas not included in the 2002–2012 work projections) on wetlands (both jurisdictional and non-jurisdictional) and on jurisdictional "other waters"; no mitigation is necessary for impacts to non-jurisdictional "other waters", which are limited to unvegetated areas of inoperable canals. For work areas included in the 2002–2012 work projections, previously provided mitigation would continue to serve as mitigation in perpetuity, as no new significant environmental effects or a substantial increase in the severity of previously identified significant effects are anticipated under the SMP Update.

Following the procedure described in Appendix C, the SCVWD would refine the quantification of impacts to wetlands and other waters that occur during a specific year, tallying the impact totals at the end of the year, and compensatory mitigation will be implemented the following year, in many cases. Exceptions will occur in cases in which compensatory mitigation is incorporated directly into Proposed Project work areas; in those cases, compensatory mitigation may be implemented during the same year in which impacts occur. Details regarding performance criteria for mitigation, as well as for monitoring and reporting, are described in Appendix C.

According to the mitigation package, SCVWD will have several options for satisfying mitigation requirements for impacts to wetlands and other waters by the SMP. The two main types of mitigation that can be applied for impacts to non-tidal wetlands and other waters resulting from sediment removal, vegetation

management, canal maintenance, and minor maintenance are “in perpetuity” mitigation and “pay as you go” mitigation.

In perpetuity mitigation. For permanent impacts and, at the discretion of SCVWD, repetitive impacts to wetlands or other waters in a specific area, SCVWD will provide mitigation in perpetuity via one or more of the following methods:

- *In-kind restoration/creation*: SCVWD will restore, preserve, and manage wetlands and aquatic habitats, or substantially improve the quality of highly degraded wetlands and aquatic habitats at a ratio of 1.5:1, meaning 1.5 acres of wetlands or other waters shall be restored/created for every 1 acre of wetlands and other waters impacted by Proposed Project activities.

- *In-kind preservation and enhancement:* SCVWD will acquire, preserve, enhance, and manage lands that provide similar ecologic functions and values to the wetlands and other waters impacted by SMP maintenance activities. The acquisition and preservation/enhancement of these higher quality lands will occur at a ratio of 3:1, meaning 3 acres of wetlands or other waters shall be acquired, preserved, and enhanced for every 1 acre of wetlands and other waters impacted by Proposed Project activities. Enhancement may include modification of existing management, limited planting, or invasive plant removal, or other activities to enhance wetland/aquatic habitat functions and values.

- *Out-of-kind preservation of watershed lands:* SCVWD will acquire, preserve, enhance, and manage watershed lands. These lands provide more general conservation, open space, and habitat values. Although acquired lands would not be specifically tied or matched in-kind to wetland impacts, as they can include a variety of non-wetland/aquatic habitats, their preservation and management will help to maintain the quality or wetlands and aquatic habitats through management focused on benefits to the aquatic environment, such as management to reduce erosion and sedimentation. The acquisition of more general watershed conservation lands will occur at a ratio of 8:1, meaning 8 acres of land shall be acquired and restored for every 1 acre of impacted habitats resulting from Proposed Project activities.

- *Enhancement or management of land that is owned by other agencies:* SCVWD may collaborate with owners of land that is currently managed for open space or passive recreation. In such cases, SCVWD would not acquire the mitigation lands but would enter into an agreement with the landowners to provide management and financial support toward preserving or improving the lands toward beneficial outcomes, including improved habitats. In these cases, a detailed management plan for species or habitats would be SCVWD’s responsibility and would not necessarily be managed by the landowner. The mitigation accounting for such “partnership projects” and how much mitigation would be provided to account for SMP Update activities would be reviewed and developed with regulatory staff on a case-by-case basis.

For any of the three mitigation options above, the mitigation areas will be preserved and managed in perpetuity by SCVWD. Mitigation could occur on lands acquired or owned by SCVWD, or on permanently protected lands not owned by SCVWD but by another entity (e.g., an open space district or park lands). These options would reduce impacts to wetlands and aquatic habitats to less-than significant levels by directly replacing wetlands (in-kind restoration/creation); directly improving the functions and values of existing wetlands and maintaining those resources through long-term management (in-kind preservation and enhancement); or indirectly enhancing and/or protecting wetland and aquatic functions and values by protecting watershed lands that contribute to wetland and aquatic habitat ecology and integrity (out-of-kind preservation of watershed lands). The mitigation ratios for these three options were selected to reflect the relative value of each type of mitigation, with in-kind restoration/creation having the lowest mitigation ratio to reflect its direct compensation for lost wetlands, and out-of-kind preservation of watershed lands having the highest mitigation ratio to reflect its more indirect value in protecting and enhancing wetlands and aquatic habitats. Because acquisition lands will be conserved in perpetuity, the mitigation they provide will also serve the SMP in perpetuity. As a result, if in-perpetuity mitigation were applied to impacts to wetlands and other waters in a certain area, no further mitigation would be needed if repetitive impacts to that area were to occur, in perpetuity.

Pay as you go mitigation. Unless it specifically decides to use in perpetuity mitigation to compensate for impacts to wetlands and aquatic habitats in a certain area (e.g., an area where sediment removal or vegetation management will have frequent, repetitive impacts), SCVWD will use two programs (invasive

plant management and riparian planting) to provide incremental "pay as you go" habitat mitigation to compensate for annual impacts to wetlands and aquatic habitats from sediment removal and vegetation management activities. A mitigation ratio of 1.2:1 (area mitigated to area impacted) shall be applied for habitat impacts from sediment removal and vegetation management activities. SCVWD can use either the invasive plant management program or the riparian planting program (or a combination of the programs) to achieve this net mitigation target for annual activities.

Invasive plant management. The primary goal of the invasive plant management program (IPMP) element of the SMP's compensatory mitigation package is to preserve and improve habitat within Santa Clara County streams and riparian corridors by reducing the population of invasive plant species. The IPMP will have a two-pronged approach:

- a systematic program with the longer-term objective of identifying, prioritizing, and controlling invasive plants throughout the Project Area; and

- an opportunistic, site-specific approach with the objective to remove invasive plants from individual SMP work sites. (As mitigation for vegetation management activities, each of the SMP maintenance sites will be evaluated for on-site invasive plant removal and control. Invasive plant management will focus on controlling species that are invasive at individual SMP work sites.)

Riparian planting. The primary goal of the riparian planting component of the SMP mitigation package is to compensate for the loss of quality and quantity of native-dominated riparian habitat because of maintenance activities. Riparian planting will enhance habitat for birds, amphibians, and other wildlife using terrestrial riparian areas while providing shading, sources of organic matter and coarse woody debris, and water quality benefits to aquatic species.

Opportunities for riparian planting and restoration will be evaluated at all vegetation management maintenance locations. SCVWD's preference will be to first prioritize riparian planting at maintenance sites, and in this way provide direct on-site mitigation for maintenance activities. Riparian planting and restoration will provide mitigation that directly addresses impacts associated with vegetation management activities. Where opportunities for onsite riparian planting and restoration are unavailable or highly constrained, SCVWD will identify offsite locations that can provide suitable mitigation opportunities. Off-site riparian planting restoration sites will be prioritized to:

- stream reaches with riparian restoration opportunities for sensitive fish and/or wildlife species;

- stream reaches where riparian restoration of existing riparian canopy gaps will improve connectivity between existing patches of high-quality riparian habitat; and

- stream reaches with riparian habitat gaps where invasive plant species have been treated to accelerate native riparian plant establishment and inhibit re-colonization by invasive plant species.

Although invasive species management and riparian planting do not result in the direct replacement of lost or degraded wetland habitat, they do contribute substantially to the protection and enhancement of aquatic functions. As a result, riparian buffer plantings have been recognized as an appropriate component of programs to mitigate impacts to jurisdictional wetlands and other waters of the U.S. by the USACE (2002).

The "pay as you go" mitigation areas will not be preserved and managed in perpetuity. However, several factors were considered in determining that these components of the mitigation plan will reduce residual impacts to wetlands and aquatic habitats to less-than-significant levels:

- These "pay as you go" mitigation options will benefit wetlands and aquatic habitats indirectly, by increasing the functions and values of existing wetland and aquatic habitats.

- Any riparian planting area used as pay as you go mitigation for impacts to wetlands or aquatic habitats will remain unimpacted for at least 10 years; or, if the mitigation area is impacted within 10 years, it will then be replaced elsewhere.

- Pay as you go mitigation will be provided each time a specific area of wetlands or other waters is impacted. For example, if the same 1-acre area were impacted three times during the 10-year SMP

Update period, then 3.6 acres of pay as you go mitigation will be provided for impacts to that area during the 10-year period.

- Impacts to any specific area will degrade, but will not entirely remove, wetland and aquatic functions and values within the impact area.

Mitigation for Bank Stabilization Impacts. Impacts to non-tidal wetlands and aquatic habitats resulting from bank stabilization will be provided via the methods described in Appendix C and using the mitigation ratios identified in Table 2-4. ~~Softscape repairs will be self-mitigating because they will not result in long-term adverse effects.~~ Mitigation may occur through a combination of replacement of "hard" stabilization measures with soft, biotechnical measures (either on the stabilization site or off-site) or out-of-kind via riparian revegetation as determined by a Mitigation Feasibility Assessment, as described in Appendix C. These measures will reduce impacts to wetlands and aquatic habitats resulting from bank stabilization by increasing the functions and values of existing wetland and aquatic habitats.

Mitigation for Impacts to Tidal Wetlands and Other Waters. SCVWD will continue to implement mitigation measures adopted to reduce impacts for the SMP. Although the 2012 project description has changed, this FSEIR has examined the Proposed Project changes and determined that the existing tidal marsh restoration mitigation measures will continue to reduce the Proposed Project impacts to less than significant. The 2012 SMP Update will be a continuation from the 2002 SMP, with some program modifications; although the work activities are updated, the original mitigation remains, along with the resulting benefits.

As mitigation for impacts to tidal habitats and tidal marsh species predicted to result from the 2002–2012 SMP work activities, SCVWD restored the "Island Ponds" (Ponds A19, A20, and A21), located between Coyote Slough and Mud Slough near Alviso, to tidal action. Restoring these ponds provided 30 acres of tidal habitat that is used by a variety of tidal marsh species. Monitoring has documented achievement of all performance criteria appropriate for the development of both vegetated tidal salt/brackish marsh and tidal aquatic habitat, ~~including~~with the formation of nascent tidal marsh habitat, including extensive channel networks, within these ponds.

The 2002 SMP work projections provided the basis for determining the SMP's initial, upfront compensatory mitigation. As a result of those projections, impacts to tidal habitats for the 2002-2012 SMP Update were calculated with a mitigation requirement of 30 acres of tidal restoration. SCVWD already has met this obligation by restoring 30 acres of tidal habitat with the "Island Ponds." ~~Thirty acres of tidal restoration within the Island Ponds was intended to serve as mitigation for impacts to tidal habitats for the 2002–2012 SMP.~~ However, not all of the 2002 projected work has actually been performed. Thus, the 2002 mitigation of 30 acres of restored tidal habitat paid for more work than was conducted. Based on the actual impacts from activities conducted between 2002–2012 ~~Proposed Project activities~~, only 9 acres of tidal mitigation ~~will be~~is needed to compensate for those impacts.

The 2002–2012 SMP created an upfront compensatory mitigation package to account for SMP impacts in perpetuity. The 2012–2022 SMP Update has modified the project description to refine maintenance work activity needs. The updated project description in this FSEIR is a continuation, with modifications, of the 2002–2012 SMP.

SCVWD will remove the 2002 work activity projections that would have resulted in the need for 21 tidal habitat mitigation acres. The removal of these projections, therefore, will equate to having 21 acres of tidal habitat mitigation that is not attributed to ongoing SMP impacts. ~~Therefore, SCVWD created 21 acres of excess tidal habitats.~~ SCVWD will use the 21 acres of ~~excess~~ tidal ~~marsh~~habitat restoration as available mitigation for impacts to tidal wetlands and aquatic habitats, as well as tidal marsh species, that may occur under the 2012–2022 SMP Update. ~~Physical breaching of the Island Pond levees and other physical work required for this tidal restoration has already occurred, and no further activities (other than continued monitoring of marsh development per the 2002–2012 SMP monitoring requirements) are proposed by SCVWD.~~

It is possible that these mitigation measures may be refined during permitting with the USACE, RWQCB, and CDFG, in which case the refinements required by these resource agencies would be implemented.

MM BIO-1 will mitigate impacts to wetlands and other waters, including jurisdictional waters of the U.S./state, to less-than-significant levels by replacing lost wetlands and aquatic habitats through restoration or by replacing the lost functions and values provided by these habitats through other means, such as non-native plant removal and watershed protection. Thus, MM BIO-1 will assure that the SMP does not result in a substantial adverse effect on federally protected wetlands or on sensitive wetland and aquatic communities.

Mitigation Measure BIO-2: Implement Compensatory Mitigation for Woody Riparian Vegetation

The compensatory mitigation package, which is incorporated into the Proposed Project and detailed in Appendix C, shall be implemented to compensate for new impacts (i.e., work areas not included in the 2002–2012 work projections) on woody riparian vegetation. For work areas included in the 2002–2012 work projections, previously provided mitigation would continue to serve as mitigation in perpetuity, as no new significant environmental effects or a substantial increase in the severity of previously identified significant effects are anticipated under the updated program.

Following the procedure described in Appendix C, the SCVWD would refine the quantification of impacts to riparian vegetation that occur during a specific year, tallying the impact totals at the end of the year, and compensatory mitigation will be implemented the following year, in many cases. Exceptions will occur in cases in which compensatory mitigation is incorporated directly into the SMP work areas; in those cases, compensatory mitigation may be implemented during the same year in which impacts occur. Details regarding performance criteria for mitigation, as well as for monitoring and reporting, are described in Appendices C and Appendix L.

According to the mitigation package, SCVWD will have several options for satisfying mitigation requirements for impacts to riparian vegetation by the SMP. The two main types of mitigation that can be applied for impacts to riparian vegetation resulting from sediment removal, vegetation management, canal maintenance, and minor maintenance are “in perpetuity” mitigation and “pay as you go” mitigation. These mitigation options would be applied to riparian vegetation as described in Mitigation Measure BIO-1 for wetlands and other waters.

For any of the three “in perpetuity” mitigation options, the mitigation areas will be preserved and managed in perpetuity by SCVWD or a land management agency. These options will reduce impacts to riparian vegetation to less-than significant levels by directly replacing such vegetation (in-kind restoration/creation); directly improving the functions and values of existing riparian vegetation and maintaining those resources through long-term management (in-kind preservation and enhancement); or indirectly enhancing and/or protecting riparian functions and values by protecting watershed lands that contribute to riparian habitat ecology and integrity (out-of-kind preservation of watershed lands). The mitigation ratios for these three options were selected to reflect the relative value of each type of mitigation, with in-kind restoration/creation having the lowest mitigation ratio to reflect its direct compensation for lost riparian vegetation, and out-of-kind preservation of watershed lands having the highest mitigation ratio to reflect its more indirect value in protecting and enhancing riparian vegetation. Because acquisition lands will be conserved in perpetuity, the mitigation they provide also will serve the SMP in perpetuity. As a result, if in-perpetuity mitigation is applied to impacts to riparian vegetation in a certain area, no further mitigation will be needed if repetitive impacts to that area occurs, in perpetuity.

“Pay as you go” mitigation via invasive plant management and riparian planting will directly compensate for impacts to riparian vegetation. In many areas, invasive plant management will remove invasive species that occupy areas that otherwise can support riparian vegetation, and that threaten further to invade riparian areas. Riparian planting obviously will provide in-kind mitigation for impacts to riparian vegetation.

Mitigation for bank stabilization impacts also will be provided, as described in Mitigation Measure BIO-1 for wetlands and other waters.

Two components of the mitigation package that are directly applicable to the compensation for impacts to riparian vegetation, but that were not applicable to (and thus not discussed in) Mitigation Measure BIO-1, are mitigation for pruning and mitigation for removal of trees 6-12 inches dbh (removal of trees greater than 12 inches dbh is not included in the SMP).

The mitigation requirement for pruning is the same as the riparian replanting mitigation ratio of 1.2:1. Based on the International Society of Arboriculture pruning standards, and the SMP Manual (Appendix A), no more than 25 percent of a tree would be pruned, unless greater pruning is necessary for safety or specific ecological purposes (e.g., codominant stem species). Applying the degree of impact (25 percent of any given tree) to the mitigation ratio of 1.2:1, the resulting mitigation factor is 0.3. Up to 40 acres of pruning may occur, and thus the resulting mitigation acreage necessary is 12 acres (40 acres x 0.3). Whereas other mitigation will be calculated on an annual basis, these 12 acres of mitigation will be provided for the entire program, and a maximum (or "cap") of 40 acres of hand pruning will be established for the entire program for the period 2012–2022.

Removal of trees up to 6 inches dbh will not require mitigation on a tree-by-tree basis; rather, impacts to woody riparian vegetation comprised of trees or shrubs less than 6 inches dbh will be mitigated (as described above) via in perpetuity or pay as you go mitigation. However, removal of trees sized 6-12 inches dbh will be mitigated through the individual planting of replacement trees. Appendix B in the 2012–2022 SMP Update Mitigation Approach Memorandum (Appendix C), Tree Scoring for Removal of Trees and Shrubs ≤ 12"DBH provides a specific tree appraisal and evaluation protocol to determine how replacement planting occurs. The protocol involves carefully assessing targeted tree removals for their existing conditions and functions, including their canopy cover, local area value, ecosystem benefits, and ecosystem detriments. Using a cumulative ranking method, tree replacement mitigation ratios for removed trees (6-12 inches dbh) occurs at either 1:1, 2:1, or 3:1 (replacement tree to removed tree), depending on the overall quality and function of the removed tree.

Impacts to riparian vegetation containing trees 6-12 inches dbh are, therefore, mitigated in two ways—mitigation on an acreage basis via in perpetuity or pay as you go mitigation, plus mitigation via replacement of trees 6-12 inches dbh. The two mitigation areas will be non-overlapping. As a result, the extent of mitigation for impacts to more mature woody riparian vegetation will be greater, as is appropriate based on the greater functions and values to wildlife, than impacts to less mature riparian vegetation.

As part of the riparian mitigation component, SCVWD will mitigate impacts to sensitive riparian communities, including sycamore alluvial woodland and oak woodland, in-kind. For a specific extent of impact to sycamore alluvial woodland or oak woodland, the in perpetuity or pay as you go mitigation that is applied to that impact will focus on enhancement, preservation, and/or restoration of that sensitive community type; removal of invasives will not be considered appropriate mitigation for these sensitive community types unless accompanied by restoration that targets that community type. Similarly, when impacts to high-quality occurrences of cottonwood-dominated forest occur, SCVWD will mitigate by providing cottonwood-dominated mitigation sites. "High-quality" occurrences will be determined by a qualified botanist based on criteria such as evidence of natural regeneration and the presence of multi-layered and multi-aged stands.

It is possible that these mitigation measures may be refined during permitting with the USACE, RWQCB, and CDFG, in which case the refinements required by these resource agencies would be implemented.

MM BIO-2 will mitigate impacts to riparian habitats to less-than-significant levels by replacing lost riparian vegetation through restoration or by replacing the lost functions and values provided by these habitats through other means, such as non-native plant removal and watershed protection. Thus, MM BIO-2 will assure that the SMP does not result in a substantial adverse effect on sensitive riparian communities.

Mitigation Measure BIO-3: Implement Compensatory Mitigation for Serpentine Communities

SCVWD will provide mitigation for unavoidable impacts to high-quality serpentine communities, including grassland, rock outcrops, seeps, and chaparral. SCVWD would refine the quantification of impacts to high-quality serpentine habitat on an annual basis. Along SCVWD's canals, where most or all SMP impacts to serpentine species and communities are expected to occur, high-quality serpentine communities were mapped by SCVWD using data gathered during surveys in 2004 and 2008. Serpentine communities are considered to be of "high quality" if they are in a semi-natural or natural/undisturbed state and meet one or both of the following criteria:

- Presence of multiple special-status plant occurrences
- Relatively high abundance of natives or serpentine obligates vs. non-natives

Before Proposed Project activities that can impact serpentine communities and species, an SCVWD botanist will conduct a review of potential serpentine impact areas using existing data, such as SCVWD's mapping, and field verification as needed, to identify high-quality serpentine communities. At the end of that year's maintenance period, SCVWD will determine the extent of impacts to high-quality serpentine communities that have occurred during the year.

Compensation for unavoidable effects to high-quality serpentine communities will be provided via the protection, enhancement, and management of serpentine communities outside SMP work sites at a 2:1 (mitigation:impact~~:mitigation~~) ratio, on an acreage basis. SCVWD will acquire land supporting serpentine communities via fee title or purchase of a conservation easement. Compensatory mitigation may be carried out through one or both of the following methods, in order of preference:

- The preservation and management of existing serpentine communities
- The restoration or enhancement of previously existing or degraded serpentine communities

SCVWD will develop a Habitat Mitigation and Management Plan (HMMP), describing the measures that will be taken to enhance and manage the mitigation lands and to monitor the effects of management on serpentine communities. That plan will include, at a minimum, the following:

- A summary of impacts to high-quality serpentine communities and the proposed mitigation
- A description of the location and boundaries of the mitigation site and description of existing site conditions
- A description of measures to be undertaken if necessary to enhance (e.g., through focused management) the mitigation site for serpentine communities
- Proposed management activities, such as managed grazing and management of invasive plants, to maintain high-quality serpentine communities
- A description of community monitoring measures on the mitigation site, including specific, objective goals and objectives (including maintaining or increasing native plant species diversity), performance indicators and success criteria (including maintaining or increasing the relative abundance of native vs. non-native species), monitoring methods (including vegetation sampling for plant species composition), data analysis, reporting requirements, and monitoring schedule

  (Determining other specific performance/success criteria requires information regarding the specific mitigation site, its conditions, the biological resources present on the site, and the specific enhancement and management measures tailored to that site and its conditions. As a result, additional~~those~~ specific criteria will be defined in the HMMP rather than in this SEIR. Nevertheless, the performance/success criteria described in the HMMP will guide the mitigation for management and protection of high-quality serpentine communities to adequately compensate for the functions and values of the impacted communities.)
- A description of the management plan's adaptive component, including potential contingency measures for mitigation elements that do not meet performance criteria
- A description of the funding mechanism for the long-term maintenance and monitoring of the mitigation lands

After mitigation has been provided for impacts to a specific area supporting high-quality serpentine communities and/or special-status species from a specific year's activities, future (i.e., repetitive) impacts to that area will not require additional mitigation.

The HMMP will be provided to the USFWS for review because some of the serpentine-associated special-status species that would benefit from this mitigation are federally listed species regulated by the USFWS. It is possible that this mitigation measure may be refined during the Section 7 consultation process with the

USFWS (e.g., in the Biological Opinion covering Project effects on federally listed, serpentine-associated species), in which case the refinements required by the USFWS would be implemented.

MM BIO-3 will mitigate impacts to sensitive serpentine communities to less-than-significant levels by replacing the functions and values provided by such communities through the enhancement, management, and protection of serpentine communities. Thus, MM BIO-3 will assure that the SMP does not result in a substantial adverse effect on sensitive serpentine communities or threaten to eliminate this plant community.

Mitigation Measure BIO-4: Implement Compensatory Mitigation for Serpentine-Associated Special-Status Plant Species

SCVWD will provide mitigation for unavoidable impacts to serpentine-associated special-status plant populations. Before Proposed Project activities that can impact serpentine communities and species, an SCVWD botanist will conduct a review of potential serpentine impact areas using existing data, such as SCVWD's mapping, and field verification as needed, to identify high-quality serpentine communities. The botanist also will conduct a pre-activity survey for special-status plants. At the end of that year's maintenance period, SCVWD would refine the quantification of impacts to populations of special-status serpentine-associated plants.

Compensation for unavoidable impacts to populations of special-status serpentine-associated plants will be provided by a combination of preservation and enhancement of those species' populations outside SMP work sites. For impacts to populations (including partial populations) of a specific special-status serpentine plant species, compensatory mitigation will include preservation, enhancement, and management of lands that (a) already support equal or greater numbers (and health) of individuals of that species and (b) contain sufficient unoccupied habitat to allow for an increase in populations, the increase being at least equivalent to the number impacted, through habitat enhancement and management. For determining the number of individuals impacted, the highest number of individuals known to be present within the impact area (if the impact area has undergone multiple surveys) will be used to determine the magnitude of the impact.

Compensatory mitigation for impacts to high-quality serpentine communities (as discussed in Mitigation Measure BIO-3) and special-status serpentine-associated plants may occur on the same lands, provided that the conditions pertaining to special-status plant species are satisfied for each species for which mitigation is required. The HMMP that will be prepared by SCVWD to describe the measures that will be taken to enhance, manage, and monitor the mitigation lands (as discussed in Mitigation Measure BIO-3) also will include consideration of focal special-status species. For example, in addition to the measures described in Mitigation Measure BIO-3, the HMMP also will include the following:

- A summary of impacts to special-status plant populations and the proposed mitigation
- A description of measures to be undertaken if necessary to enhance (e.g., through focused management) the mitigation site for special-status species
- A description of measures to transplant individual plants or seeds from the impact area to the mitigation site, if determined by a qualified botanist to be appropriate and to have a high likelihood of success
- Proposed management activities, such as managed grazing and management of invasive plants, to maintain high-quality habitat conditions for the focal species
- A description of species monitoring measures on the mitigation site, including specific, objective goals and objectives (including enhancement of populations of focal special-status species on the mitigation site), performance indicators and success criteria (including increasing the abundance of the focal species by at least as many individuals as were impacted), monitoring methods (including sampling for the focal species), data analysis, reporting requirements, and monitoring schedule. Determining other specific performance/success criteria requires information regarding the specific mitigation site, its conditions, the biological resources present on the site, the specific plant species for which mitigation is being provided, and the specific enhancement and management measures tailored to the mitigation site and its conditions. As a result, ~~those~~ additional specific criteria will be defined in the HMMP rather than in this SEIR. Nevertheless, the

performance/success criteria described in the HMMP will guide mitigation to manage and protect high-quality serpentine habitat for, and populations of, the impacted species. The HMMP will include monitoring for non-native plant species and remediation measures in the event that such species are detected on the site.

After mitigation has been provided for impacts to special-status plant populations in a specific area from a specific year's activities, future (i.e., repetitive) impacts to that area will not require additional mitigation.

The HMMP will be provided to the USFWS for review because some of the serpentine-associated special-status species for which the HMMP will be prepared are federally listed species regulated by the USFWS. It is possible that this mitigation measure may be refined during the Section 7 consultation process with the USFWS (e.g., in the Biological Opinion covering Project effects on federally listed, serpentine-associated species), in which case the refinements required by the USFWS would be implemented.

MM BIO-4 will mitigate impacts to special-status serpentine-associated plants to less-than-significant levels by enhancing, managing, and protecting populations of these species so that the SMP does not substantially reduce the number or restrict the range of rare or endangered serpentine-associated plants or have a substantial adverse effect on special-status serpentine-associated plants.

Mitigation Measure BIO-5: Implement Compensatory Mitigation for Impacts to Non-Serpentine Special-Status Plant Species

If Proposed Project activities result in the loss of individual non-serpentine special-status plants, other than the Santa Clara red ribbons, Hospital Canyon larkspur, western leatherwood, Hall's bush-mallow, and robust Monardella, compensatory mitigation will be provided. Before Proposed Project activities that can impact these special-status species, an SCVWD botanist will conduct a review of potential impact areas using existing data, and field verification as needed, to identify areas of potential occurrence of these species. The botanist also will conduct a pre-activity survey for special-status plants in areas where occurrence is possible. At the end of that year's maintenance period, SCVWD will determine the extent of impacts to populations of these special-status plants.

Compensation for unavoidable impacts to populations of special-status non-serpentine plants will be provided by a combination of preservation and enhancement of those species' populations outside SMP work sites. For impacts to populations (including partial populations) of a specific special-status plant species, compensatory mitigation will include preservation, enhancement, and management of lands that (a) already support equal or greater numbers (and health) of individuals of that species and (b) contain sufficient unoccupied habitat to allow for an increase in populations, the increase being at least equivalent to the number impacted, through habitat enhancement and management. For determining the number of individuals impacted, the highest number of individuals known to be present within the impact area (if the impact area has undergone multiple surveys) will be used to determine the magnitude of the impact.

SCVWD will develop an HMMP describing the measures that will be taken to enhance and manage the mitigation lands and to monitor the effects of management on the focal special-status plant species. That plan will include, at a minimum, the following:

- A summary of impacts to special-status plant populations, and the proposed mitigation
- A description of the location and boundaries of the mitigation site and description of existing site conditions
- A description of measures to be undertaken if necessary to enhance (e.g., through focused management) the mitigation site for special-status species
- A description of measures to transplant individual plants or seeds from the impact area to the mitigation site, if determined by a qualified botanist to be appropriate and to have a high likelihood of success
- Proposed management activities to maintain high-quality habitat conditions for the focal species

- A description of species monitoring measures on the mitigation site, including specific, objective goals and objectives (including enhancement of populations of focal special-status species on the mitigation site), performance indicators and success criteria (including increasing the abundance of the focal species by at least as many individuals as were impacted), monitoring methods (including sampling for the focal species), data analysis, reporting requirements, and monitoring schedule. Determining other specific performance/success criteria requires information regarding the specific mitigation site, its conditions, the biological resources present on the site, the specific plant species for which mitigation is being provided, and the specific enhancement and management measures tailored to the mitigation site and its conditions. As a result, additional~~those~~ specific criteria will be defined in the HMMP rather than in this SEIR. Nevertheless, the performance/success criteria described in the HMMP will guide the mitigation to manage and protect high-quality habitat for, and populations of, the impacted species. The HMMP will include monitoring for non-native plant species and remediation measures in the event that such species are detected on the site.

- A description of the management plan's adaptive component, including potential contingency measures for mitigation elements that do not meet performance criteria

- A description of the funding mechanism for the long-term maintenance and monitoring of the mitigation lands

After mitigation has been provided for impacts to a specific area supporting special-status species from a specific year's activities, future (i.e., repetitive) impacts to that area will not require additional mitigation.

MM BIO-5 will mitigate impacts to special-status non-serpentine plants to less-than-significant levels by enhancing, managing, and protecting populations of these species so that the SMP does not substantially reduce the number or restrict the range of rare or endangered non-serpentine plants or have a substantial adverse effect on special-status non-serpentine plants.

Mitigation Measure BIO-6: Implement Compensatory Mitigation for Impacts to Serpentine-Associated Special-Status Invertebrates

SCVWD will compensate for its impacts to populations and habitat of serpentine-associated special-status invertebrates through the preservation and management of serpentine communities as described for Mitigation Measure BIO-3. The procedures for identifying impacts to potential habitat of these species will occur as described for serpentine communities under Mitigation Measure BIO-3. Mitigation lands will be preserved and managed as described for Mitigation Measure BIO-3 as well, with the qualification that for any impacts to high-quality serpentine communities within Bay checkerspot butterfly critical habitat, the compensatory mitigation lands also must be in Bay checkerspot critical habitat. The management and monitoring of mitigation lands, as described in the HMMP, will include measures specifically targeting the Bay checkerspot butterfly, which will serve as a proxy for the other special-status invertebrates.

The HMMP will be provided to the USFWS for review because one of the serpentine-associated special-status species (Bay checkerspot butterfly) for which this HMMP will be prepared is a federally listed species regulated by the USFWS. It is possible that this mitigation measure may be refined during the Section 7 consultation process with the USFWS (e.g., in the Biological Opinion covering Project effects on the Bay checkerspot butterfly), in which case the refinements required by the USFWS would be implemented.

MM BIO-6 will mitigate impacts to serpentine-associated special-status invertebrates to less-than-significant levels by enhancing, managing, and protecting populations of these species so that the SMP does not substantially reduce the number or restrict the range of rare or endangered serpentine-associated invertebrates or have a substantial adverse effect on special-status serpentine-associated invertebrates.

Mitigation Measure BIO-7: Tree Replacement

The SCVWD will replace ordinance trees as follows. As discussed under Mitigation Measure BIO-2, removal of trees sized 6-12 inches dbh will be mitigated through the individual planting of replacement trees. Section 5.5 in Appendix C (Mitigation for Tree and Shrub Removals 6–12 inches dbh) provides a specific tree appraisal and evaluation protocol to determine how replacement planting should occur. The protocol in Section 5.5 of Appendix C will involve carefully assessing targeted tree removals for their existing conditions and functions, including their canopy cover, local area value, ecosystem benefits, and ecosystem

detriments. Using a cumulative ranking method, tree replacement mitigation ratios for removed trees (6-12 inches dbh) will occur at either 1:1, 2:1, or 3:1 (replacement tree to removed tree), depending on the overall quality and function of the removed tree. Therefore, if any trees 6-12 inches dbh that are removed are ordinance trees (depending on the locality in which tree removal occurs), then mitigation will be provided as described in Section 5.5 of Appendix C.

It is possible that this mitigation measure may be refined during the permitting process by the USACE, CDFG, or RWQCB, in which case the refinements required by these agencies would be implemented.

MM BIO-7 will mitigate impacts to ordinance trees to less-than-significant levels by replacing trees that are removed so that the SMP does not conflict with the provisions of local tree ordinances.

Mitigation Measure BIO-8: Augmentation of Spawning Gravel

SCVWD will implement gravel augmentation as mitigation for SMP impacts to CCC and SCCC steelhead spawning habitat. If more than ~~500~~ 100 square feet of sediment removal is proposed along steelhead streams, an SCVWD fisheries ecologist will assess the sediment removal site for spawning and rearing habitat quality before the initiation of work. The biologist will determine the extent of sediment that is proposed for removal and that is considered to be “high-quality” spawning gravel, based on the following criteria:

- Less than 25-30 percent fines less than 6.35 mm (Kondolf 2000, Kondolf and Wolman 1993)
- Less than 12-14 percent fines less than 0.85 mm (Kondolf 2000)
- D50 (median particle size) of 12.5 to 22.0 mm, based on D50 of rainbow trout and steelhead from 30 to 65 cm length (Kondolf and Wolman 1993), corresponding to a range of 275 to 640 cm of steelhead adults recovered in streams of the San Francisco estuary (Leidy et al. 2005)
- Minimum patch size greater than 1.1 m2 (Trush 1991)

The habitat needs to be accessible under typical flows for when the appropriate life stages are present. Suitable depths and velocities must be available during flows typical of spawning season. Factors related to accessibility include depth and velocity criteria, which for spawning, are:

- Depth: 10–150 cm (Moyle 2002)
- Velocity: 20–155 cm/s (Moyle 2002)

If more than ~~500~~ 100 square feet of high-quality gravel will be removed along steelhead streams, compensatory mitigation will be provided by the installation of suitable spawning gravel along the affected creek at a 1:1 (mitigation:impact) ratio on a square footage or acreage basis. Locations where sediment removal is performed at fish ladders will not require gravel augmentation. The mitigation site will be as close to the impacted reach as is feasible, and will be located within a steelhead-accessible reach of the same creek. The site will be selected with input from the fisheries ecologist, taking channel capacity and other SMP-related factors into account. The fisheries ecologist will prepare specifications for the mitigation, including size, type, depth, and configuration of gravel. The mitigation will be implemented within 1 year following the impact.

Mitigation Measure BIO-9: Augmentation of Instream Complexity for Non-Tidal Stream Fish

SCVWD will provide mitigation for loss of instream complexity, which provides habitat heterogeneity, cover, and refugia during high flows, by in-kind installation of structures that provide such complexity. Before sediment removal, bank stabilization, or large woody debris removal activities, the affected area will be surveyed by an SCVWD fisheries ecologist to identify any features that provide high-quality instream complexity for fish. The ecologist will determine that such features are of “high quality” based on a ~~combination~~the presence of one or more of the following criteria:

- Large woody debris providing cover and refugia from high flow velocities

- Deep pools providing rearing habitat and refugia from high flow velocities
- Cobble/boulder features providing cover, refugia from high flow velocities, and velocities suitable for good invertebrate drift

If such high-quality features must be removed during Proposed Project activities, compensatory mitigation will be provided by the installation of instream complexity features on a 0.~~5~~1:1 (impact:mitigation~~:impact~~) basis, on the basis of either the number of complexity features or the area that is affected hydraulically by the features that are removed; the fisheries ecologist will determine which of these two metrics is appropriate based on the values to fish provided by the impacted features. Thus, one instream complexity feature will be installed for every ~~two~~ one that ~~are~~ is removed, or an instream complexity feature hydraulically affecting roughly ~~half~~ the same area of the feature(s) removed will be installed. ~~This ratio is less than 1:1 under the understanding that erosion, deposition, tree falls, and debris mobilization within a few years following the removal of instream complexity will naturally reintroduce some complexity to the stream.~~

As examples, enhancing instream complexity may involve:

- enlarging an existing large woody debris feature;
- anchoring a large woody debris feature;
- geomorphically shaping an instream bar or bed feature for improved habitat;
- enhancing a pool feature threatened by sedimentation; or
- enhancing streambed conditions to increase the range of flow velocity and habitat conditions.

Priority for these mitigation activities will be given to SMP sites where instream features cannot be retained during construction because of conflicting objectives. For example, if a channel pool configuration cannot be retained during a bank protection job and the area is devoid of other complex pool features, then this area will be evaluated for the addition of an instream complexity feature.

In addition to enhancing existing features, new instream features may be developed to achieve several habitat objectives, including: increasing pool habitat in homogenized stream reaches, providing escape cover for rearing and spawning fish, deepening feeding areas in riffle habitat, creating a variety of stream flow velocities for cover, sorting gravel, and providing resting areas for upstream migration. Additionally, improving instream function can benefit other aquatic flora and fauna by improving the overall stream complexity for which these species depend on for survival. If effective, such new instream complexity features (particularly in highly modified, urban streams) can augment or replace existing structural features required for successful reproduction and rearing of native fish and amphibians in the freshwater environment.

Newly developed instream habitat improvements may use log structures, boulder structures, or a combination of both log and boulder structures to achieve more complex habitats. Possible configurations of boulders or logs include weirs, clusters, single and opposing wing deflectors, spider logs, and digger logs. The construction materials selected for each instream complexity feature will depend on the target objective and site conditions.

The selected mitigation site will be as close to the impacted reach as is technically feasible. For instream complexity features that are removed by sediment removal or bank stabilization activities, mitigation will be incorporated into the same reach where complexity was removed to the extent feasible. The site will be selected with input from the fisheries ecologist, taking channel capacity and other SMP-related factors into account. The fisheries ecologist will prepare specifications for the mitigation, including size, type, and configuration of the feature. The mitigation will be implemented within 1 year following the impact. The fisheries ecologist will then inspect the completed complexity feature to assure that it meets the criteria for “high quality” instream complexity listed above.

It is possible that MM BIO-8 and MM BIO-9 may be refined during the Section 7 consultation process with the NMFS (e.g., in the Biological Opinion covering Project effects on steelhead) or by the USACE, CDFG, or

RWQCB in permits issued by these agencies, in which case the refinements required by these agencies would be implemented.

MM BIO-8 and BIO-9 together will mitigate impacts to steelhead to less-than-significant levels by enhancing habitat for this species so as to protect its populations, thereby ensuring that the SMP does not substantially reduce the number or restrict the range of this threatened species, have a substantial adverse effect on this special-status species, or impede the use of its nursery sites.

Mitigation Measure BIO-10: Implement Compensatory Mitigation for the California Tiger Salamander

SCVWD will provide mitigation to compensate for unavoidable impacts to California tiger salamanders and their habitat. SCVWD would refine the quantification of impacts to California tiger salamander habitat on an annual basis. At the end of each year's maintenance period, SCVWD will determine the extent of impacts to lands that are both within the potential range of the California tiger salamander and within potentially suitable habitat for the species. To determine whether the SMP impacts are within the potential range of the species, SCVWD will rely on the mapping in Figure 3.3-10 (which may be as modified over the course of 2012–2022, based on any new information that may modify the understanding of the species' potential range in the Project Area). To determine habitat suitability, an SCVWD biologist will determine whether the impact areas support land uses that are not conducive to California tiger salamander use, such as developed lands; all other land uses will be considered potential California tiger salamander habitat.

Compensation for these effects will be provided via the protection, enhancement, and management of habitat that currently supports, or can support, this species at a 2:1 (mitigation:impact~~:mitigation~~) ratio, on an acreage basis. Compensatory mitigation may be carried out through one or both of the following methods, in order of preference:

- The preservation, management, and enhancement (e.g., through long-term management targeted toward this species) of high-quality habitat that is already occupied by California tiger salamanders

- The restoration or enhancement of degraded habitat or habitat that is unsuitable for use by California tiger salamanders, but that (a) is in close proximity to areas of known occurrence and (b) can be made more suitable for use via construction of one or more breeding ponds or management to improve the quality and availability of burrows in upland habitat

Because most, if not all, impacts to California tiger salamander habitat will consist of modification of upland refugial/dispersal habitat (rather than aquatic breeding habitat), mitigation lands will also consist of upland habitat for this species. All mitigation lands for this species must be located within Santa Clara County and within the area where the species is thought to be extant as shown in Figure 3.3-10 (or as otherwise modified over the course of 2012–2022, based on any new information that may modify the understanding of the species' potential range in the Project Area). SCVWD will develop an HMMP describing the measures that will be taken to manage the property and to monitor the effects of management on the California tiger salamander. That plan will include, at a minimum, the following:

- a summary of impacts to California tiger salamander habitat and populations, and the proposed mitigation;

- a description of the location and boundaries of the mitigation site and description of existing site conditions;

- a description of measures to be undertaken if necessary to enhance (e.g., through focused management) the mitigation site for California tiger salamanders;

- proposed management activities, such as managed grazing, management of invasive plants, measures targeted at sustaining populations of burrowing mammals, or other measures to maintain high-quality habitat for California tiger salamanders;

- a description of species monitoring measures on the mitigation site, including specific, objective goals and objectives (including maintaining or improving habitat suitability for California tiger salamanders), performance indicators and success criteria (including maintaining or increasing the abundance of upland refugia for California tiger salamanders), monitoring methods (such as

sampling of the abundance of upland refugia), data analysis, reporting requirements, and monitoring schedule. Determining other specific performance/success criteria requires information regarding the specific mitigation site, its conditions, and the specific enhancement and management measures tailored to the mitigation site and its conditions. For example, performance criteria for a mitigation site providing only upland habitat for California tiger salamanders would include the maintenance of grassland habitat of a suitable height and density for burrowing mammals, and maintenance of suitable burrowing mammal populations, whereas a mitigation site providing salamander breeding habitat would also include criteria related to adequate depth and hydroperiod of breeding habitat. As a result, ~~those~~ additional specific criteria will be defined in the HMMP rather than in this SEIR. Nevertheless, the performance/success criteria described in the HMMP will guide the mitigation to manage and protect high-quality habitat for the California tiger salamander, adequate to compensate for impacts.

- a description of the management plan's adaptive component, including potential contingency measures for mitigation elements that do not meet performance criteria; and

- a description of the funding mechanism for the long-term maintenance and monitoring of the mitigation lands.

If lands that SCVWD currently owns, such as mitigation lands acquired for the California red-legged frog for the 2002–2012 SMP, can be enhanced (e.g., via the construction of breeding ponds) in such a way as to substantially improve their value to California tiger salamanders, then SCVWD may use those lands as mitigation for the California tiger salamander. After mitigation has been provided for impacts to a specific area supporting the California tiger salamander from a specific year's SMP Update activities, future (i.e., repetitive) impacts to that area will not require additional mitigation.

The HMMP will be provided to the USFWS and CDFG for review because this species is both state and federally listed. It is possible that this mitigation measure may be refined during the Section 7 consultation process with the USFWS (e.g., in the Biological Opinion covering Project effects on the California tiger salamander) or the Section 2081 consultation process with the CDFG (e.g., in an Incidental Take Permit), in which case the refinements required by these agencies would be implemented.

MM BIO-10 will mitigate impacts to the California tiger salamander to less-than-significant levels by enhancing, managing, and protecting habitat for this species so as to protect its populations, thereby ensuring that the SMP does not substantially reduce the number or restrict the range of this threatened/endangered species, have a substantial adverse effect on this special-status species, or impede the use of its nursery sites.

Mitigation Measure BIO-11: Implement Compensatory Mitigation for the California Red-Legged Frog

SCVWD will provide mitigation to compensate for unavoidable impacts to California red-legged frogs and their habitat. SCVWD would refine the quantification of impacts to California red-legged frog habitat on an annual basis. At the end of each year's maintenance period, SCVWD will determine the extent of impacts to lands that are both within the potential range of the California red-legged frog and within potentially suitable habitat for the species. To determine whether the SMP impacts are within the potential range of the species, SCVWD will rely on the mapping in Figure 3.3-13 (which may be as modified over the course of 2012–2022, based on any new information that may modify the understanding of the species' potential range in the Project Area). To determine habitat suitability, an SCVWD biologist will determine whether the impact areas support land uses that are not conducive to California red-legged frog use, such as developed lands; all other land uses will be considered potential California red-legged frog habitat.

Compensation for these effects will be provided via the protection, enhancement, and management of habitat that currently supports, or could support, this species at a 2:1 (mitigation:impact~~:mitigation~~) ratio, on an acreage basis. Compensatory mitigation may be carried out through one or both of the following methods, in order of preference:

- The preservation, management, and enhancement (e.g., through long-term management targeted toward this species) of high-quality habitat that is already occupied by California red-legged frogs

- The restoration or enhancement of degraded habitat or habitat that is unsuitable for use by

California red-legged frogs, but that (a) is in close proximity to areas of known occurrence and (b) could be made more suitable for use via construction of one or more breeding ponds, enhancement of breeding and non-breeding aquatic habitat via improvements to emergent vegetation or other cover, or management to improve the quality of upland habitat

Because much of the impact to California red-legged frog habitat will consist of modification of upland refugial/dispersal habitat (rather than aquatic breeding or foraging habitat), the mitigation lands will include upland habitat for this species. All mitigation lands for this species must be located within Santa Clara County and within the area where the species is thought to be extant as shown in Figure 3.3-13 (or as otherwise modified over the course of 2012–2022, based on any new information that may modify the understanding of the species' potential range in the Project Area). SCVWD will develop an HMMP describing the measures that will be taken to manage the property and to monitor the effects of management on the California red-legged frog; the HMMP will include components similar to those described for California tiger salamanders, including the maintenance or improvement of habitat conditions and components (i.e., refugia in dispersal habitat). Determining other specific performance/success criteria for this mitigation requires information regarding the specific mitigation site, its conditions, and the specific enhancement and management measures tailored to the mitigation site and its conditions. For example, performance criteria for a mitigation site providing only upland habitat for California red-legged frogs would include the maintenance of grassland habitat of a suitable height and density for use by dispersing frogs, whereas a mitigation site providing red-legged frog breeding habitat would also include criteria related to adequate depth and hydroperiod of breeding habitat and suitable vegetative cover. As a result, ~~those~~ additional specific criteria will be defined in the HMMP rather than in this SEIR. Nevertheless, the performance/success criteria described in the HMMP will guide the mitigation to manage and protect high-quality habitat for the California red-legged frog, adequate to compensate for impacts.

After mitigation has been provided for impacts to a specific area supporting the California red-legged frog from a specific year's activities, future (i.e., repetitive) impacts to that area will not require additional mitigation.

The HMMP will be provided to the USFWS for review because the California red-legged frog is a federally listed species regulated by the USFWS. It is possible that this mitigation measure may be refined during the Section 7 consultation process with the USFWS (e.g., in the Biological Opinion covering Project effects on the California red-legged frog), in which case the refinements required by the USFWS would be implemented.

MM BIO-11 will mitigate impacts to the California red-legged frog to less-than-significant levels by enhancing, managing, and protecting habitat for this species so as to protect its populations, thereby ensuring that the SMP does not substantially reduce the number or restrict the range of this threatened species, have a substantial adverse effect on this special-status species, or impede the use of its nursery sites.

Mitigation Measure BIO-12: Implement Compensatory Mitigation for the Least Bell's Vireo

One of the following two measures will be implemented so that adequate willow-dominated riparian habitat with adjacent shrubs and tall forbs is maintained in extreme southern Santa Clara County, in light of proposed activities, to provide potential nesting habitat for least Bell's vireos. Simultaneous with (i.e., within the same maintenance year as) performance of SMP activities that adversely affect least Bell's vireo habitat, the SCVWD will make the decision as to which of these measures will be applied.

- Mitigation Measure BIO-12A: The projected vegetation management regime for lower Llagas Creek, from Southside Drive downstream to the confluence with the Pajaro River, will be modified so that vegetation management in any specific area will occur no more frequently than every 3 years to allow for the regrowth of shrubs and taller forbs, which will provide foraging habitat for least Bell's vireos and other riparian birds. The levee tops and lower maintenance roads will be excluded from this requirement (i.e., vegetation management can occur on the levee tops and lower maintenance roads as needed), but no other vegetation management will occur more frequently than every 3 years. Furthermore, in any specific year, vegetation management will occur along no more than half (measured longitudinally along the creek) of the reach of lower Llagas Creek downstream from Southside Drive. This will assure that at any specific time, at least half of this reach will support vegetation that has not been managed (with the exception of levee top roads

and lower maintenance roads) for at least 3 years, thus providing ample suitable nesting and foraging habitat for the low-level, irregular use of this reach by Bell's vireos that occurs. These limitations may need to be adapted if they do not maintain sufficient tall, weedy habitat along the edges of the woody riparian corridor to provide suitable least Bell's vireo foraging habitat, or if they produce abnormally dense, stunted growth of willows that is not suitable for use by nesting vireos. This measure is preferred by the District over Mitigation Measure 12B. However, if this measure cannot be implemented feasibly, or if SCVWD elects not to implement this measure, Mitigation Measure BIO-12B will be implemented.

- Mitigation Measure BIO-12B: SCVWD will create or restore conditions similar to those currently present along lower Llagas Creek by acquiring land, an easement on land, or permission from landowners along the Pajaro River, or along Carnadero Creek downstream from Highway 25, and managing a strip 50 feet wide outside of the woody riparian canopy so that tall forbs and shrubs are able to grow. This strip will be managed so that portions of it are disturbed (via mowing or herbicide use) every 3–4 years, with no more than half disturbed in a specific year, so that early successional conditions are maintained (with the caveat that this management regime may need to be adapted, as described in the preceding paragraph, so that suitable conditions are maintained). The linear footage of habitat that will be required to be managed in this way will equal the linear footage of lower Llagas Creek (on each side of the creek, downstream from Southside Drive, that is actually subjected to the proposed non-instream vegetation management activities and not managed as described in Mitigation Measure BIO-12A. If this mitigation option is selected, the SCVWD will prepare a HMMP for the mitigation site that includes the following:

  — a summary of impacts to least Bell's vireo habitat and populations, and the proposed mitigation;

  — a description of the location and boundaries of the mitigation site and description of existing site conditions;

  — a description of measures to be undertaken if necessary to enhance (e.g., through focused management) the mitigation site for the least Bell's vireo;

  — proposed management activities to maintain high-quality habitat for least Bell's vireos;

  — a description of species monitoring measures on the mitigation site, including specific, objective goals and objectives (including maintaining or restoring suitable habitat for the least Bell's vireo), performance indicators and success criteria (including maintenance or improvement of habitat structure suitable for use by least Bell's vireos), monitoring methods (including least Bell's vireo surveys), data analysis, reporting requirements, and monitoring schedule. Determining other specific performance/success criteria requires information regarding the specific mitigation site, its conditions, and the specific enhancement and management measures tailored to the mitigation site and its conditions. As a result, additional ~~those~~ specific criteria will be defined in the HMMP rather than in this SEIR. Nevertheless, the performance/success criteria described in the HMMP will guide the mitigation to manage and protect habitat at least as suitable for use by the least Bell's vireo as the habitat that is impacted.

  — a description of the management plan's adaptive component, including potential contingency measures for mitigation elements that do not meet performance criteria; and

  — a description of the funding mechanism for the long-term maintenance and monitoring of the mitigation lands.

The HMMP will be provided to the USFWS and CDFG for review because this species is both state and federally listed. It is possible that this mitigation measure may be refined during the Section 7 consultation process with the USFWS (e.g., in the Biological Opinion covering Project effects on the least Bell's vireo) or by the CDFG during the Section 2081 consultation process (e.g., in an Incidental Take Permit), in which case the refinements required by these agencies would be implemented.

MM BIO-12 will mitigate impacts to the least Bell's vireo to less-than-significant levels by managing and protecting habitat suitable for use by this species, thereby ensuring that the SMP does not substantially reduce the number or restrict the range of this endangered species, have a substantial adverse effect on this special-status species, or impede the use of its nursery sites.

Mitigation Measure BIO-13: Implement Compensatory Mitigation for the Burrowing Owl

If a burrow that has been used for nesting by burrowing owls within the prior 3 years cannot be avoided (e.g., an occupied burrow is located on an eroding bank that must be repaired to maintain public safety), then the CDFG will be consulted to determine an appropriate relocation plan for the owl(s) in accordance with BMP GEN-7 and habitat compensation will be provided. If the habitat surrounding the burrow from which the owl is evicted remains suitable for use by burrowing owls following completion of the SMP activity (based on an assessment by a qualified biologist), SCVWD will have the option of either providing habitat mitigation off-site, as described below, or monitoring the work site to determine whether it is re-occupied by burrowing owls. If SCVWD documents nesting by burrowing owls within 2 years of completion of the maintenance activity in the vicinity of the impact site indicating that the activity did not have a long-term impact on the owls' use of the site, no further mitigation would be required.

If the maintenance activity will degrade habitat quality to the extent that maintaining owl use of the site is not feasible or ecologically preferable, in the opinion of a qualified SCVWD biologist, then off-site mitigation will be provided to compensate for the loss of occupied burrowing owl nesting habitat. California burrowing owl mitigation guidelines recommend that 9.75–19.5 acres of habitat be preserved and managed per occupied burrowing owl nest burrow (whether by a pair or singly) in mitigation sites (California Burrowing Owl Consortium 1993). The amount of mitigation habitat provided will depend on whether the mitigation habitat is occupied by burrowing owls (9.75 acres), adjacent to occupied habitat (13.0 acres), or suitable but unoccupied (19.5 acres). SCVWD will use these guidelines in determining the extent of mitigation habitat to be provided. The mitigation site must be located in Santa Clara County, or in areas of San Mateo or Alameda counties adjacent to San Francisco Bay, so that the mitigation supports the maintenance of South Bay burrowing owl populations.

This mitigation may be provided via the management of suitable habitat on SCVWD lands (either existing lands or lands that are acquired), purchase of credits in a mitigation bank (if one is available), or contribution of funds toward the management of the required amount of suitable habitat owned by another entity. If SCVWD provides habitat mitigation on its own lands, either on existing SCVWD lands or on lands that are acquired for mitigation purposes, an HMMP will be prepared detailing the areas to be preserved for owls; the methods for managing on-site habitat for owls and their prey (including vegetation management to maintain low-statured herbaceous vegetation); methods for enhancing burrow availability within the mitigation site (potentially including the provision of artificial burrows, although long-term management for ground squirrels will be important as well); measures to minimize adverse effects of development on owls on-site; and a monitoring program and adaptive management program. The monitoring program will include performance indicators and success criteria, including maintenance of short vegetation supporting California ground squirrels and maintenance of increase in burrowing owl numbers on the mitigation site. Determining other specific performance/success criteria requires information regarding the specific mitigation site, its conditions, and the specific enhancement and management measures tailored to the mitigation site and its conditions. For example, performance criteria for a site where burrowing owls are known to occur (including maintaining or increasing burrowing owl abundance) may differ from those for an unoccupied site adjacent to occupied burrowing owl habitat (including attracting owls to use the mitigation site). As a result, those specific criteria will be defined in the HMMP rather than in this SEIR. Nevertheless, the performance/success criteria described in the HMMP will guide the mitigation to manage and protect high-quality habitat for burrowing owls, adequate to compensate for impacts.

~~The HMMP will be submitted to the CDFG for review.~~ If a mitigation bank providing credits for burrowing owls is established within the aforementioned mitigation area (i.e., in Santa Clara County, or in areas of San Mateo or Alameda counties adjacent to San Francisco Bay), then mitigation may take the form of the purchase of credits equivalent to the number of acres of mitigation required.

MM BIO-13 will mitigate impacts to the burrowing owl to less-than-significant levels by managing and protecting habitat suitable for use by this species, thereby ensuring that the SMP does not substantially reduce the number or restrict the range of this rare species, have a substantial adverse effect on this special-status species, or impede the use of its nursery sites.

Mitigation Measure BIO-14: Implement Compensatory Mitigation for the Yellow Warbler

For impacts to occupied yellow warbler breeding habitat (i.e., riparian habitat known to have been occupied in recent years by the species) in areas for which mitigation has not already been provided for the 2002–2012 SMP, implementation of Mitigation Measure BIO-2 will be required to occur in areas where riparian habitat creation, restoration, and preservation will benefit yellow warblers (e.g., in relatively undeveloped reaches of creeks rather than in creeks surrounded closely on both sides by development), such that mitigation according to these measures occurs at a ratio of no less than 1:1 (on an acreage basis). SCVWD will determine whether impacted riparian habitat is suitable for this species on the basis of breeding-season surveys or comparison of habitat conditions to those in known occupied areas.

MM BIO-14 will mitigate impacts to the yellow warbler to less-than-significant levels by restoring habitat suitable for use by this species, thereby ensuring that the SMP does not substantially reduce the number or restrict the range of this rare species, have a substantial adverse effect on this special-status species, or impede the use of its nursery sites.

Mitigation Measure BIO-15: Provide Alternative Bat Roost

If a tree or structure containing a pallid bat maternity roost is to be removed by the Proposed Project, a qualified biologist will design and determine an appropriate location for an alternative roost structure. If a tree containing a maternity roost of this species is not removed, but SMP-related disturbance causes the abandonment of the roost site (even during the non-breeding season), then SCVWD may either monitor the roost site to determine whether the affected species returns to the roost, or construct an alternative roost. If SCVWD elects to monitor the roost and bats do not return within 1 year, then an alternative roost will be constructed.

A qualified biologist will determine the appropriate location for the alternative roost structure, based on the location of the original roost and habitat conditions in the vicinity. The roost structure will be built to specifications as determined by a qualified biologist, or it may be purchased from an appropriate vendor. The structure will be placed as close to the impacted roost site as feasible. SCVWD will monitor the roost for up to 3 years (or until occupancy is determined, whichever occurs first) to determine use by bats. If by Year 3 pallid bats are not using the structure, a qualified bat biologist, in consultation with the CDFG, will identify alternative roost designs or locations for placement of the roost, and monitoring of the new roost will occur for an additional 3 years (or until occupancy has been verified).

MM BIO-15 will mitigate impacts to the pallid bat to less-than-significant levels by providing alternative roosting habitat suitable for use by this species, thereby ensuring that the SMP does not substantially reduce the number or restrict the range of this rare species, have a substantial adverse effect on this special-status species, or impede the use of its nursery sites.

Mitigation Measure BIO-16: Invasive Plant ~~Species~~ Management Program

The primary goal of the IPMP element of the SMP's compensatory mitigation package is to preserve and improve habitat within Santa Clara County streams and riparian corridors by reducing the population of invasive plant species. Controlling the spread of invasive plant species is a critical element in improving the ecological health of our streams and watersheds. Invasive plants thrive and spread aggressively negatively altering resource allocation regimes, wildlife patterns, soil stability and water quality thus degrading habitat quality and the overall ecological value of a site. In addition, invasive plants can exacerbate flooding and fire danger, undermine structural assets, and impact access to roads, levees and trails.

The IPMP will provide compensatory mitigation for SMP vegetation impacts to upland, riparian, freshwater and tidal wetlands by eliminating or significantly reducing the population of invasive plant species from these affected habitats. The IPMP will have a two-pronged approach:

- A systematic program to identify, prioritize, and control invasive plants throughout the Project Area
- An opportunistic, site-specific approach to remove invasive plants from individual work sites

The intent is that these two programs, operating at different yet complimentary spatial scales will enhance the overall ecological health of the SMP's creek ecosystems. For the opportunistic portion of the program,

invasive plant management will focus on controlling species that are highly invasive at individual SMP work sites.. For example, species such as giant reed, Cape ivy, Himalayan blackberry, tree of heaven, English ivy, and perennial pepperweed will be targeted for removal or control.

At the systematic program-area scale, the IPMP will develop a priority matrix of invasive plant species which integrates and weighs a variety of factors including: the 2006 CAL-IPC ratings, the anticipated rate of spread without management intervention, the feasibility of effective control, impacts to fish and wildlife, impacts to sensitive plant communities, increases in flood threat, increases to fire danger, aggressive growth patterns known to cause structural damage, and impediments to maintenance access. Priority target species will be selected annually from this matrix. The IPMP will then prioritize locations for control work where:

- the target species are degrading habitat for sensitive fish and/or wildlife species;
- invasive plant removal and subsequent native habitat colonization will improve connectivity between existing patches of high-quality habitat;
- the upstream extents of invasive plant species distribution (in the Project Area) will be targeted to reduce the potential for re-invasion of control sites via propagules dispersal from upstream source populations; and
- invasive plant control is technically feasible (e.g., because of access constraints) and can be accomplished while minimizing impacts to adjacent aquatic, wetland, and riparian habitats.

The targeted invasive species, and the location and extent of invasive species management, will be tied directly to the SMP's impacts in each habitat type, i.e., upland, riparian, freshwater and tidal wetland, so that the benefits of invasive species management will directly offset the adverse effects in these habitats. Integrated Vegetation Management techniques will be employed including mechanical, chemical, biological, and/or a combination of techniques to utilize the most effective method for each target species while providing the greatest amount of protection to environmental resources.

Invasive Plant Management Mitigation Requirement

Invasive plant management mitigation will be targeted at both on-site and off-site locations. For the larger systematic program, mitigation needs and credit will be determined annually, dependent on the proposed work for the year and the associated impacts expected to be incurred in each habitat type, i.e., upland, riparian, freshwater, and tidal wetland impacts. A proposal for mitigation credit and the associated acreage to be treated for this program will be submitted with the annual "Notice of Proposed Work."

The opportunistic effort will be variable each year dependent on the number of work sites where invasive plant removal is feasible. Mitigation credit accrued for this portion of the Program will be used to compensate for on-site vegetation impacts or for ongoing vegetation maintenance activities. Proposed mitigation credit for each project site will be submitted with the annual "Notice of Proposed Work."

Determining specific performance/success criteria would require specific information regarding the invasive plant management sites and the invasive species being managed. As a result, those specific criteria will be defined in the IPMP rather than in this EIR. Nevertheless, the performance/success criteria described in the IPMP will guide the mitigation to manage invasive plants, adequate to compensate for impacts.

MM BIO-16 will mitigate impacts resulting from invasive plant species to less-than-significant levels by avoiding and controlling such invasions, thereby ensuring that the SMP does not substantially degrade the quality of the environment; reduce the number or restrict the range of endangered or threatened species; have a substantial adverse effect on special-status species, wetlands, or other sensitive natural communities; impede the use of nursery sites; or conflict with local or regional conservation plans as a result of such invasions.

Mitigation Measures: GCC-1A On-site or Off-site GHG Emissions Mitigation Program

In recent years, SCVWD has reduced its GHG emissions on several projects, including production of energy from SCVWD-owned renewable sources. As a result, SCVWD has GHG emissions credits that have not been previously applied as reductions/offsets for GHG emissions. SCVWD also may establish a new

program to implement off-site GHG emissions reduction projects within the SFBAAB to obtain the new emissions credits. SCVWD will use existing or new emissions credits to reduce/offset GHG emissions from the SMP in exceedance of BAAQMD operational significance thresholds.

The total credits will be equal to the average emissions above the threshold over the lifetime of the SMP Update, or 30,402 metric tons (the average exceedance between the 2012 and 2020 estimated emissions, multiplied by 10 years), as adjusted based on the emissions reductions achieved by Mitigation Measure AIR-1A. The GHG emission reductions credits/projects will be from sources of emissions that are not required by any existing law to reduce their GHG emissions. Offsetting annual emissions inherently includes offsetting daily emissions. Therefore, no additional reductions/offsets will be required for daily GHG emissions. Documentation of any existing or new GHG reductions/offsets will be provided to the BAAQMD. In addition, any existing or new SCVWD GHG offset credits accounted for under this mitigation measure will be verified by the Climate Action Reserve so that the offsets are real, permanent, and verifiable.

This mitigation measure may not be feasible, based on costs, logistics, or other factors. Regarding logistics, whether the District could develop a new on-site or off-site mitigation program to effectively reduce emissions to less-than-significant levels in a timely manner is uncertain.

Mitigation Measures: GCC-1B: GHG Emissions Offsets

As an alternative to Mitigation Measure GCC-1A, or if SCVWD does not have sufficient GHG credits, SCVWD may purchase additional GHG emissions credits. The total credits will be equal to the average emissions above the threshold over the lifetime of the SMP Update, or 30,402 metric tons, as adjusted based on the emissions reductions achieved by Mitigation Measure AIR-1A.

For purchased credits, SCVWD will open a Climate Action reserve account or engage a private broker to facilitate the purchase of carbon offset credits from a voluntary market. Carbon offset credits purchased by SCVWD will be banked by the Climate Action Reserve, so that carbon offset credits purchased are real, permanent, and verifiable. Carbon offset credits will be measured in metric tons of CO2e. Documentation of existing and/or purchased GHG offsets will be provided to the BAAQMD.

Appendix M
FISH RELOCATION GUIDELINES

1. PURPOSE and SCOPE:

This work instruction is designed to respond to planned and unplanned de-watering events (drybacks) in streams and other water bodies in the jurisdiction of the Santa Clara Valley Water District. The purpose of these efforts is to recover fish and wildlife resources that are at risk during dryback events in order to minimize potential impacts on these natural resources. The primary strategy is to capture organisms ("fish" to include all aquatic species) in areas where water is dried back and relocate them to flowing or standing water. Reconnaissance and operational guidelines for planned and unplanned dryback events are provided in this document.

While these guidelines have been adopted to effectively conduct safe and orderly fish relocations, specific situations may dictate a deviation from these guidelines. As such, each guideline element should be viewed as modifiable to adapt to the immediate circumstances on-site.

2. REFERENCE DOCUMENTS:

Q822F01	Ecological Monitoring & Assessment Program quality Assurance Systems Requirements
EMAP-W20006	Ecological Equipment Checkout Instructions
EMAP-W20007	Disinfection of Biological Equipment

Smith-Root Inc. Model LR-24 and Model 12 Backpack Electrofisher User Manuals

3. DEFINITIONS:

Unplanned Dryback Operations: Unscheduled events where the flow of water is unintentionally modified by reducing the volume of water in the channel or redirecting flows so that the channel downstream becomes dry. Mobilization for unplanned dryback operations are based on the elements of a planned dryback event.

Planned Dryback Operations: Scheduled events where the flow of water is intentionally modified by reducing the volume of water in the channel or redirecting flows so that the channel downstream becomes dry.

4. REQUIREMENTS:

4.1. ISO 9001

7.5.1 Control of Production and Service Provision

4.2. ISO 14001

4.4.6 Operational Control

4.3. Other Requirements

Board Ends Policy No. E-4 (12/15/09): There is water resources stewardship to protect and enhance watersheds and natural resources and to improve the quality of life in Santa Clara County.

4.1.1.1 Balance the protection and restoration of sensitive fisheries and aquatic species, such as steelhead trout, with a reliable water supply.

5. MONITORING AND MEASUREMENT:

Conduct biennial desk audit of fish relocation activities to ensure that fish relocation activities are documented.

6. PROCEDURE:

Overview	Details	Quality Records
(1) Determine Need for Fish Relocation (Fisheries Biologist)	• Determine rationale for the rescue and be prepared to communicate this information to other staff and the environmental resource agencies.	
↓		
(2) Conduct Reconnaissance Survey (Fisheries Biologist)	*NOTE: A member of the District biological staff with a current scientific collecting permit must be on-site before fish rescues are attempted and resource agency authorization is obtained, unless pre-approval to relocate fish has been granted in a standing agreement (e.g., under the Stream Maintenance Program or other permits).* • Upon arrival at the site, District personnel will determine the extent of the dryback and if there will be any immediate or foreseeable impacts to fish and wildlife. • Conduct a reconnaissance survey of the dryback zone to establish an operational response. Depending on the species and site, fish and aquatic wildlife may need to be transported to various release sites. • A variety of elements to be considered in executing a fish resource relocation operation include: a) Staging area: Identify staging areas in the dryback zone. Sites should be selected on the basis of proximity and access to the dryback zone and safe operation of the equipment. b) Relocation sites: Priority shall be given to close proximity to the dryback zone within the same stream; if no suitable site within the stream is available, then “second choice” locations within	

Overview	Details	Quality Records
	the watershed will be selected. In all cases, the closest site that is likely to result in a successful rescue will be used. c) Transport routes. d) Need for pumping: Determine if pumping activities are necessary and begin as early as possible and timed for optimum relocation activities. e) Downstream vs. Upstream: Species rescued will be transported downstream if possible and upstream only for short distances if downstream sites are not feasible. f) Disease Considerations: Fish will not be moved upstream over substantial barriers or long distances upstream to guard against disease transmission. g) Relocation of anadromous Fish: Salmonid fry and non-smolted juveniles should be moved upstream to a location of perennial running water; smolts should be moved downstream to a location where flow runs continuously to the bay; and adults should be moved according to their spawning condition: unspawned fish upstream to perennial flow; spawned fish downstream where flow runs continuously to the bay. h) Collection and transport methods will be determined per site conditions. Methods will also be selected to maximize efficiency of collection effort while minimizing handling and transport time and stress. Local transport of fish may be executed by various methods including: i) Net transfer: Appropriate for short distances where rapid transfer is possible. j) Live car: Appropriate for temporary holding in stream and short distances where rapid transfer is required. a) Bucket: Appropriate for temporary holding and transport over short-medium distances. Holding	

Overview	Details	Quality Records
	time should be minimized if possible or supplemental aeration supplied. b) Prioritization of species and collection/relocation sites to be prioritized as follows: 1. Endangered species 2. Threatened species 3. Species of special concern 4. Native fishes not under the above categories 5. Non-native fishes if appropriate	
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(3) Notify Resource Agencies (Fisheries Biologist)	• Identify a point person to contact appropriate resource agencies (California Department of Fish and Game, National Marine Fisheries Service, U.S. Fish and Wildlife Service). This is typically the collecting permittee. • Notify appropriate environmental resource agencies to communicate the details of the fish relocation and to confirm disposition instructions. Notification is typically done 24 hours in advance when possible.	
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(4) Coordinate Media and Public Relations (Public Information Officer and/or lead Fisheries Biologist)	• Contact the District's Public Information Office to serve as a point person for media coverage. As appropriate, PIO staff will develop media information and coordinate appropriate onsite media activities to minimize onsite risk to press and onlookers during operations. • Coordinated media events minimize disruption to operation logistics and timing to maximize safety to participants. Isolation of media activities out of channel is preferred. • For safety, escort media personnel if in-channel or close-proximity events are staged.	
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(5) Plan Operational Logistics (Fisheries Biologist)	• Identify and secure all necessary equipment for the fish relocation activities (*EMAP-W20006 Ecological Equipment Checkout Instructions*) • Arrange multiple transport vehicles to minimize holding time and fish stress.	

Overview	Details	Quality Records
	• Contact operational personnel and confirm the degree of mobilization required. • Ensure that mobile communication devices are available in transport vehicles.	

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(6) Conduct Fish Relocation (Lead Fisheries Biologist and Field Crew)	1. Setup • Upon arrival at the site, review the operational sequence and logistics and designate field assignments. Conduct a review of safety and operation methods. Discussion elements may include: site access; local hazards; environmental considerations; media and public safety; equipment operation, etc. 2. Live well Operation • If necessary, set up live wells early in the operation in order to stabilize tank conditions. • Use local “native” water to fill live wells if available and clean. • Reduce and manage temperature of live wells as appropriate at 5-10 degrees F to lessen stress in fish. Slightly lower temperature slows metabolism and ammonia production and at the same time will avoid thermal shock. • Start the aeration system prior to placing fish into the live well to ensure that sufficient oxygen is present during the adjustment period. When salmonids are placed in the live well, managed the live well to the extent possible so that the dissolved oxygen concentration will be greater than 6 ppm but less than saturation. • Salmonids may be transported separately from other fish to reduce stress, handling time, and potential predation in the live well. • To reduce stress in salmonids, at times, a 0.8-0.9	

	ppt salt solution (never exceeding 1.0 ppt), may be used in the live well to relax the osmotic stress and better manage crowded conditions. This treatment will also help rid the fish of fungal and bacterial agents. This will be administered and managed by trained fisheries biologists if deemed necessary. 3. Electrofishing Operation • Adjust the electrofishing unit settings to the conductivity and temperature of the water. Adjust setting for either varying width (wide to narrow) or varying frequency (high to low) to minimize possible fish injury when these settings elicit proper taxis for fish capture. • Record the settings used and any incidental electrofishing mortalities in the field notebook. If electrofishing mortalities for salmonids and other species listed as threatened or endangered exceed 5% of the total capture, electrofishing activities will be reevaluated and possibly terminated. • Note fish other than salmonids that are mortalities from electrofishing activities as an indicator of possible injury or mortality rate to salmonids and other fish (i.e. Sacramento suckers are more susceptible to electrofishing injury and mortality than other species and give an ancillary indication of electrofishing success). 4. General Collection Guidelines • Execute collection of fish in a manner to minimize handling time and stress, yet maintain the safety of personnel. • Use multiple buckets and/or live cars to reduce crowding during collection and transfer. • Pre-sort fish as needed for transport. • Equip buckets that hold salmonids until subsequent transfer to a live well with portable aerators. 5. Transport • Transport fish to minimize holding time an alternately	EMAP-F30001 Field Notebook Form

	sequenced in tandem with ongoing collection activities. • Only fisheries biologist with appropriate permits will transportation and accompany all transport operations. • Continue normal live well operations during transport. 6. Records and Data • Inventory fish and record other pertinent data, including species, numbers of each species, disposition, and other data such as fork length, etc. as appropriate. If conditions preclude a complete inventory, at a minimum, document species present, their disposition, and an estimate of their abundance. • Record information on ambient site conditions, including photo documentation at collection and release sites, as appropriate, and other information on collection, handling, and transport.	
(7) Conduct Demobilization (Fisheries Biologist)	• Sterilize equipment according to *Disinfection of Biological Equipment* (EMAP-W20007). • Conduct an assessment of the fish relocation to identify lessons learned, estimate the number of individual fish and fish species moved and determine the mortality rate. • Prepare a report summarizing the cause of the dryback, the merits of the fish relocation, and the results of the assessment. This report will be kept on file and copies forwarded to the appropriate environmental resource agencies or interested parties.	Fish Relocation Report

7. QUALITY RECORDS:

QUALITY RECORD	Location Kept	Filing Order	Duration Kept	Disposition	Comments
Field Notebook Form	Project File	Date	Permanent	Archive	
Fish Relocation Report	Project File	Date	Permanent	Archive	

8. CHANGE HISTORY:

Date	Revision	Comments
3/18/10	R1	New Release